Exhibit 6

UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF NEW YORK

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UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	12 Civ. 1422 (JSR)
	)	
v.	)	ECF Case
	)	
COUNTRYWIDE FINANCIAL CORPORATION;	)	
COUNTRYWIDE HOME LOANS, INC.;	)	
COUNTRYWIDE BANK, FSB; BANK OF	)	
AMERICA CORPORATION; BANK OF	)	
AMERICA, N.A.; and REBECCA MAIRONE,	)	
	)	
Defendants.	)	
	)	
	)	

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EXPERT REPORT OF ROBERT GLENN HUBBARD

June 18, 2013

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I. QUALIFICATIONS

1. My name is Robert Glenn Hubbard. I am the Dean of the Graduate School of Business at Columbia University, where I hold the Russell L. Carson Professorship in Finance and Economics. In addition, I am a Professor of Economics in the Department of Economics of the Faculty of Arts and Sciences. At the National Bureau of Economic Research, I am a Research Associate in programs on corporate finance, public economics, industrial organization, monetary economics, and economic fluctuations and growth. I am also a visiting scholar at the American Enterprise Institute in programs on tax policy and financial markets. Since 2006, I have been the Co-chair of the Committee on Capital Markets Regulation, a nonpartisan organization offering analyses and policy advice on financial regulation. Prior to joining the Columbia faculty as Professor of Economics and Finance in 1988, I taught in the Department of Economics at Northwestern University. I have also served as Visiting Professor of Business Administration at Harvard Business School, John M. Olin Visiting Professor at the University of Chicago, Visiting Professor and Research Fellow of the Energy and Environmental Policy Center at Harvard University's John F. Kennedy School of Government, and John M. Olin Fellow at the National Bureau of Economic Research. I hold A.M. and Ph.D. degrees in Economics from Harvard University, and B.A. and B.S. degrees in Economics from the University of Central Florida, *summa cum laude*.

2. My professional work has centered on problems in corporate finance, public economics, industrial organization, monetary economics, and natural resource economics. I have authored more than 100 publications, edited a number of books, and authored leading textbooks on money and financial markets, macroeconomics, and principles of

economics. I have examined issues relevant to financing and the macroeconomy and written on the recent financial crisis and the real estate market in particular.[1]

3. I have been an advisor or consultant to the Board of Governors of the Federal Reserve System, Congressional Budget Office, Federal Reserve Bank of New York, Internal Revenue Service, International Trade Commission, National Science Foundation, U.S. Department of Energy, and U.S. Department of the Treasury. From 1991 to 1993, I served as Deputy Assistant Secretary (Tax Analysis) of the U.S. Department of the Treasury, where I was responsible for economic analysis of tax policy, the administration's revenue estimates, and health care policy issues. From 2001 to 2003, I served as Chairman of the President's Council of Economic Advisers. Over that time period, I also served as Chair of the Economic Policy Committee for the Organization for Economic Cooperation and Development in Paris. A copy of my *curriculum vitae* is attached as Appendix A.

II. CASE BACKGROUND

4. Between January 2006 and December 2009, Countrywide's Full Spectrum Lending Division ("FSL") sold 249,459 loans to Fannie Mae and Freddie Mac (together, the "GSEs"). Certain of those loans were originated through the High Speed Swim Lane ("HSSL") process. Plaintiff claims that Countrywide used the HSSL process "[i]n order to increase the speed at which it originated and sold loans to the GSEs" and subsequently "eliminated every significant checkpoint on loan quality and compensated its employees based solely on the volume of loans originated, leading to rampant instances of fraud and

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[1] *See*, for example, Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis & Policy*, 9: Issue 3 (Symposium), Article 8, 2009.

other serious loan defects."[2]   As described in the Expert Report of Plaintiff's Expert, Daniel McFadden, "[t]he alleged consequence of the HSSL is an increase in underwriting defects and reduction in experienced oversight that increased delinquency rates, taking into account market conditions and conventional measures of borrower risk."[3]

5.   I understand the parties to the litigation disagree regarding the definition of HSSL loans. As provided in the Expert Report of Dr. Joseph Mason, Plaintiff defines HSSL loans as those approved between August 2007 and December 2009 at particular Countrywide processing centers and for which Countrywide's Automated Underwriting System ("AUS") variable has certain entries.[4]   The Entity Defendants[5] define HSSL loans as those that were originated during the "pilot" period from August through September 2007 by specific "branches" at two processing centers, as well as loans that were originated under the subsequent rollout of the "Central Fulfillment" program by specific "branches" at four processing centers between October 2007 and April 2008.   In addition, the Entity Defendants maintain that only those loans that did not involve a loan underwriter should be considered to have been originated through the HSSL process.[6]   The definition of HSSL loans has a substantial impact on the number of loans at issue.   Using Plaintiff's definition ("PHSSL"), the total HSSL loan count is 53,175, compared to 11,481 using the Entity Defendants' definition ("DHSSL").

6.   Plaintiff's experts submitted a series of reports on May 7, 2013.   Dr. Charles D. Cowan's

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[2] United States of America v. Countrywide Financial Corporation *et al.*, Amended Complaint, January 11, 2013 ("Complaint"), ¶ 2.
[3] Corrected Expert Report of Daniel L. McFadden, June 6, 2013 ("Corrected McFadden Report"), ¶ 7.
[4] *See* Expert Report of Dr. Joseph R. Mason, May 7, 2013 ("Initial Mason Report"), ¶ 6 and Appendix C. Plaintiff's definition of HSSL requires the AUS field to equal Accept, Accept-DC, Accept-HIC, ECACC1, or ECACC2.
[5] The Entity Defendants are Countrywide Financial Corporation, Countrywide Home Loans, Inc., Countrywide Bank, FSB, Bank of America Corporation, and Bank of America, N.A.
[6] *See* Appendix B for additional details on the Entity Defendants' definition of HSSL loans.

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Expert Report describes the methodology by which Dr. Cowan selected a sample of 1,000 PHSSL and non-PHSSL loans to be re-underwritten by Mr. Ira H. Holt. Jr.[7] In his report, Dr. Cowan extrapolates Mr. Holt's re-underwriting results for the PHSSL sample loans to the broader population of PHSSL loans and conducts an analysis of the relationship between Mr. Holt's findings and loan performance.   Mr. Holt's Expert Report describes the re-underwriting process and results for 865 of the 1,000 sample loans.[8,9] Mr. Holt's findings are captured by his characterization of each sample loan as either "Investment Quality with No Defects", "Investment Quality with Underwriting Violations", or "Materially Defective."   Allegedly Materially Defective loans are those for which Mr. Holt "determined that a reasonable underwriter would likely conclude (1) that the deviation [from guidelines] increased the credit risk of the loan relative to a loan that complied with the guidelines or (2) that the increased risk was not offset by adequate and sufficiently documented strengths (or compensating factors)."[10]   Dr. Daniel L. McFadden uses Mr. Holt's re-underwriting results to evaluate the relationship between loan performance and both alleged underwriting defects and the use of loan specialists for the sample loans.[11]   On May 14, 2013, Dr. McFadden submitted *errata* detailing corrections to the Initial McFadden Report.[12] On May 28, 2013, he submitted a still more

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[7] Expert Report of Charles D. Cowan, Ph.D., May 7, 2013 ("Cowan Report"), ¶ 5; Expert Report of Ira H. Holt, Jr., May 7, 2013 ("Holt Report"), p. 2.

[8] Holt Report, p. 16.

[9] Dr. Cowan explains the decision to review only 865 of the 1,000 sample loans (526 of the 600 HSSL sample loans and 339 of the 400 non-HSSL sample loans) as follows: "It is my opinion that, with the preliminary results from the first 526 loans and the nature of the review conducted to date, the continued review of the loans remaining with full loan files would not be productive. The defect rate in the properly weighted sample was over 30%, the defect rate for defaulted loans was at almost 50% (49.9%), and more than half of the materially defective loans had two or more material defects recorded. Accordingly, re-underwriting was terminated for both HSSL and non-HSSL loans." Cowan Report, ¶ 82.

[10] Holt Report, p. 18.

[11] Expert Report of Daniel L. McFadden, May 7, 2013 ("Initial McFadden Report").

[12] Errata to the May 7, 2013 Expert Report of Daniel L. McFadden, May 14, 2013 ("McFadden First Errata").

extensive correction to the Initial McFadden Report in which he revised his econometric models and presented both updated and new analyses.[13] On June 6, 2013, Dr. McFadden submitted further corrections to his May 28, 2013 filing,[14] as well as a revised report intended to incorporate the series of *errata* and corrections and entirely replace the Initial McFadden Report.[15] Dr. Joseph R. Mason submitted an initial report on May 7, 2013 followed by a revised report on May 31, 2013.[16] His report relies upon Mr. Holt's re-underwriting findings for the sample drawn by Dr. Cowan to calculate alleged losses suffered by the GSEs.[17]

III. ASSIGNMENT

7. Counsel for the Entity Defendants has asked me to:

    i.   provide an overview of the macroeconomic conditions and residential real estate market prior to, during, and after the sale of the loans at issue, and describe how these conditions contributed, if at all, to mortgage delinquencies and defaults during that time period;

    ii.   compare the performance of HSSL loans to that of non-HSSL loans sold to the GSEs by the Entity Defendants and to that of comparable loans sold to the GSEs by all lenders;

    iii.   evaluate Dr. Cowan's analysis and, in particular, his extrapolation of Mr. Holt's re-underwriting findings from the loan samples to the broader

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[13] Correction to the May 7, 2013 Expert Report of Daniel L. McFadden, May 28, 2013 ("McFadden First Correction").

[14] Correction to the May 7, 2013 Expert Report of Daniel L. McFadden, June 6, 2013 ("McFadden Second Correction"); Errata for Supplement to the May 7, 2013 Expert Report of Daniel McFadden, June 6, 2013 ("McFadden Second Errata").

[15] Corrected McFadden Report, Cover Page.

[16] Updated and Corrected Expert Report of Dr. Joseph R. Mason, May 31, 2013 ("Corrected Mason Report").

[17] Corrected Mason Report, ¶¶ 10, 12.

> population of loans and his finding that the default rate is significantly higher
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> for loans identified by Mr. Holt as materially defective;[18] and

> iv.   evaluate Dr. McFadden's analysis, including the relationship between Mr.
>
>   Holt's defect findings and loan performance.

8. In working on this assignment, I have relied upon the documents and data listed in Appendix C. Others working under my supervision and direction have assisted me in this matter.

9. I am compensated at an hourly rate of $1,200 per hour for my time spent on this matter. In addition, I receive compensation based on the professional fees of those working under my supervision and direction. Payment for my work and those working under my supervision and direction on this matter is in no way contingent on the opinions I express or the outcome of this matter.

IV. SUMMARY OF OPINIONS

10. Based on my research and analyses to date, it is my opinion that the unanticipated and unprecedented deterioration in macroeconomic conditions that occurred from late 2006 through 2009 followed by a weak economic recovery caused a dramatic increase in mortgage delinquencies, defaults, and foreclosures:

> i.   Nationwide, home mortgage delinquencies and defaults began to increase in 2007, and continued to increase to unprecedented levels in subsequent years.

> a.   The total U.S. mortgage serious delinquency rate began increasing in early 2007 and continued to rise through the fourth quarter of 2009.[19]   The rate

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[18] Dr. Cowan includes loans that are 90 or more days delinquent in his "default" category. *See* Cowan Report, footnote 5. Note that there is a difference between delinquency and default because delinquent loans may return to a current status.

increased from 2.2 percent in the first quarter of 2007 to 9.7 percent in the fourth quarter of 2009. The U.S. subprime delinquency rate increased even more dramatically, from 8.3 percent in the first quarter of 2007 to 30.6 percent in the fourth quarter of 2009. While these rates have fallen since 2009, they remained high as of the end of 2012, with the U.S. mortgage serious delinquency rate at 6.8 percent and the U.S. subprime delinquency rate at 21.7 percent.

ii. Declines in house prices and worsening economic conditions caused industry-wide increases in defaults and delinquencies.

a. After peaking in June 2006, home prices nationwide declined by thirty percent as of December 2009. Home prices fell six consecutive years from 2006 through 2011, with a compound annual rate of decline of 6.4 percent per year. Prior to 2006, nationwide home prices had not fallen by more than 1.0 percent in a year and had never fallen in two consecutive years since 1945.

b. After declining through most of the period from 2004 through 2006, the national unemployment rate started to increase in the third quarter of 2007 and continued to increase through 2008 and 2009. Unemployment peaked in late 2009 at 9.9 percent and as of December 2012 was at 7.8 percent, still far above average levels over the last 30 years. Prior to 2009, one has to go back to 1984 to find a higher rate of unemployment in the U.S.

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[19] U.S. mortgage serious delinquency is defined as mortgage payments past due 90 or more days plus mortgage foreclosure inventory for all residential loan types. The rates "are calculated based on the number of loans serviced and not the dollar value." [Mortgage Bankers Association, National Delinquency Survey Facts, May 2008]

11. While there is strong evidence that macroeconomic factors, particularly declining house prices, caused nationwide home mortgage loan delinquencies and defaults, Plaintiff has claimed that Countrywide's alleged misrepresentations about its underwriting contributed to the performance of the HSSL loans. In order to determine the contribution, if any, that the alleged misrepresentations of the quality of Countrywide's underwriting may have had on the performance of the HSSL loans, I compare the performance of the HSSL loans to that of comparable non-HSSL loans, and to that of comparable loans sold to the GSEs by all lenders.[20] Had the HSSL loans been originated using poorer underwriting standards than those used for non-HSSL loans or loans originated by other lenders, one would expect the loans to have experienced a higher level of default and serious delinquency. In fact, just the opposite is true. I find that HSSL loans have performed as well as or better than non-HSSL loans both before and after accounting for the disclosed characteristics of the loans and macroeconomic conditions. This conclusion holds regardless of whether I use Dr. McFadden's logit model or my own panel logit model, and regardless of whether I use Plaintiff's definition of HSSL loans or the Entity Defendants' definition. In addition, I find that both PHSSL and DHSSL loans have performed better than comparable loans sold to the GSEs by all lenders, after controlling for disclosed loan characteristics and changes in macroeconomic conditions.

12. I have evaluated the analyses presented by Plaintiff's expert, Dr. Cowan. I find that he and Plaintiff's other experts omit analyses which he claims were integral to his sampling design and that are fundamental to the allegations at issue. In addition, his conclusion

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[20] I define comparable non-HSSL loans and GSE loans as those loans with origination dates, FICO scores, and CTLV ratios that fall within the same ranges as the HSSL loans.

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that loans identified as Materially Defective by Mr. Holt ("Holt Materially Defective loans") experience a higher level of default is flawed:

- Despite Dr. Cowan's purportedly careful design of a sample capable of assessing the relative defect rates of PHSSL and non-PHSSL loans, he and Plaintiff's other experts present defect rate estimates for PHSSL loans with no mention of defect rate estimates for non-PHSSL loans. In fact, according to Mr. Holt's re-underwriting findings, PHSSL loans have a *lower* defect rate than non-PHSSL loans.

- Dr. Cowan concludes that the default rate is significantly higher for Holt Materially Defective loans than Holt Non-Materially Defective loans. According to Mr. Holt, Materially Defective loans "deviated from the GSE Guidelines in a way that materially increased the credit risk of the loan[s]…."[21] However, Dr. Cowan fails to control for risk characteristics known to affect loan performance, such as credit scores and CLTV ratios, which Plaintiff's expert Dr. McFadden acknowledges are associated with default. In fact, Holt Materially Defective loans are riskier along many of these dimensions. Dr. Cowan's disregard of such factors renders his comparison of default rates essentially meaningless, as he fails to consider differences in disclosed risk characteristics between Holt Materially Defective and Holt Non-Materially Defective loans that are likely to affect default risk.

13. I have also evaluated the analyses presented by Plaintiff's expert, Dr. McFadden. I find that he, too, omits analyses relevant to the allegations at issue – namely, whether Holt

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[21] Holt Report, p. 4.

Materially Defective loans are in fact associated with higher levels of default.   His

analysis simply fails to address this fundamental question.

- Dr. McFadden's regression models do not directly evaluate the relationship

between Material Defects as identified by Mr. Holt ("Holt Material Defects") and

loan performance.   Instead, Dr. McFadden constructs an alternative defect

measure which essentially alters Mr. Holt's defect findings in such a way that Dr.

McFadden ensures he will find a statistically significant relationship between his

altered defect findings and loan performance.[22] This measure both fails to capture

the primary relationship of interest (that is, the relationship between Holt Material

Defects and loan performance) and biases the results to give the inaccurate

impression that Dr. McFadden has found a strong relationship between Mr. Holt's

re-underwriting findings and the probability of serious delinquency.

- Dr. McFadden presents two regression models, a logit model and a duration

model.[23]   Using Dr. McFadden's own logit model, I find that there is only a

marginally statistically significant relationship between Holt Material Defects and

the probability of serious delinquency among all sample loans. I find that there is

no statistically significant relationship between Holt Material Defects and the

probability of serious delinquency for PHSSL loans in particular.   Using Dr.

McFadden's own duration model, I find that there is no statistically significant

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[22] Hereinafter, I use the phrase "statistically significant" to indicate a statistically significant difference from zero at the 95 percent confidence level. I use the phrase "marginally statistically significant" to indicate a statistically significant difference from zero at the 90 percent confidence level. I use the phrase "strongly statistically significant" to indicate a statistically significant difference from zero at the 99 percent confidence level.

[23] The logit model estimates the relationship between loan performance and the explanatory variables (for example, loan characteristics and house prices) as of a single point in time, while the duration model captures period-by-period decisions by borrowers to prepay, remain current, or become delinquent or default as a function of the contemporaneous explanatory variables.

relationship between Holt Material Defects and the probability of serious delinquency for either all sample loans or for PHSSL loans in particular. These findings call into question the reliability of Mr. Holt's re-underwriting findings. Loans he identified as being Materially Defective, and therefore as allegedly having materially increased credit risk, are not statistically significantly more likely to default than Non-Materially Defective loans at the 95 percent confidence level, the confidence level standard set by Plaintiff's expert, Dr. Cowan. It would therefore be inappropriate to use Mr. Holt's findings to calculate losses because Plaintiff's experts have not adequately established that Mr. Holt has correctly identified defects that increased the risk of default (as he claims to have done based on his definition of Material Defects) or that the defects he has identified have caused losses for the HSSL loans.

- Related to the finding above regarding the potential unreliability of Mr. Holt's re-underwriting results, I find evidence of inconsistent judgment being applied by Mr. Holt's re-underwriters. If loans were assigned randomly to re-underwriters, or were assigned based on observable loan characteristics, one would expect to find consistency in the defect rates across re-underwriters after controlling for loan characteristics. I do not find this to be the case. Rather, after controlling for relevant loan and borrower characteristics, I find statistically significant differences in the defect rates across the members of Mr. Holt's re-underwriting team. Such inconsistencies further call into question the reliability of Mr. Holt's defect findings, and therefore also the reliability of the conclusions drawn by Plaintiff's other experts that were based on those findings.

- Dr. McFadden's "scenario analysis" is flawed and misleading. Dr. McFadden estimates the change in the count of seriously delinquent loans for the counterfactual scenario in which none of the PHSSL loans are either defective or approved by loan specialists. This scenario analysis suffers from the same issue described above, in that Dr. McFadden uses his alternative defect measure rather than Holt Material Defects in estimating the effect of defects on the number of seriously delinquent loans. In addition, Dr. McFadden's performance measure (if a loan was ever 90 days delinquent) does not measure whether losses will actually be incurred on those loans.

14. In the remainder of the report, I expand upon these opinions and provide the bases for them. In Section V, I provide an overview of the real estate market during the relevant time period. In Section VI, I describe my analysis comparing the performance of the HSSL loans to that of non-HSSL loans and loans sold to the GSEs by all lenders. In Section VII, I evaluate Dr. Cowan's analyses and in Section VIII, I evaluate Dr. McFadden's analyses.

V. OVERVIEW OF THE RESIDENTIAL REAL ESTATE MARKET

15. In this section, I describe the real estate market and mortgage market growth through mid-2006. I also provide an overview of the unprecedented decline that followed, with a collapse in real estate prices and a dramatic increase in the number of mortgage delinquencies, defaults, and foreclosures. In particular, I focus on the period after August

2007, the month both Plaintiff and the Entity Defendants identify as the start of the HSSL program.[24]

A.   Home Price Appreciation and Growth in the Mortgage Market Industry

16. The years 2004 through 2006 were a period of significant growth in volume and values for both the residential real estate market and the primary and secondary mortgage markets.   Residential real estate prices, as measured by the Case-Shiller Home Price Index, increased at a compound annual growth rate of 13.6 percent from January 2000 to June 2006, when prices peaked at more than double their 2000 values.[25]   In comparison, from January 1990 to January 2000, prices grew at a compound annual rate of 2.0 percent (*see* Exhibit 1).

17. From 2002 to 2006, both interest rates and mortgage rates were low, which, as I have explained in my scholarly research, played a crucial role in home price appreciation.[26] As displayed in Exhibit 2, the effective federal funds rate remained within the range of approximately three to eight percent for the period from 1990 through 2000.[27]   The

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[24] *See* Initial Mason Report, ¶ 6 and Appendix C. *See* Appendix B for the Entity Defendants' definition of HSSL loans.

[25] In the remainder of the report, when describing home prices, I refer to the Case-Shiller Composite (10) Home Price Index, which tracks monthly changes in the value of the residential real estate market in 10 metropolitan regions (Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, D.C.). The index uses a value-weighted repeat sales pricing technique to measure changes in these housing markets. [Standard & Poor's, S&P/Case Shiller Home Price Indices Methodology, November 2009]

[26] *See* Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis and Policy:* Vol. 9: Issue 3 (Symposium), Article 8, 2009, p. 12. [27] The federal funds rate is the interest rate banks charge each other for overnight loans. The interest rate that the borrowing bank pays to the lending bank to borrow the funds is negotiated between the two banks, and the weighted average of this rate across all such transactions is the effective federal funds rate. [Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm][28] Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm

[27] The federal funds rate is the interest rate banks charge each other for overnight loans. The interest rate that the borrowing bank pays to the lending bank to borrow the funds is negotiated between the two banks, and the weighted average of this rate across all such transactions is the effective federal funds rate. [Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm][28] Federal Reserve Selected Interest Rates (Daily) – H.15, available at http://www.federalreserve.gov/releases/h15/data.htm

federal funds rate dropped below two percent in December 2001, and remained at historically low levels until early 2005. In addition, rates for conventional 30-year mortgages generally fell during this time period and the prime interest rate decreased from 8.5 percent in January 2000 to a low of 4.0 percent in July 2003.[28] Lower interest rates and mortgage rates encouraged borrowers to either refinance their existing mortgages or to purchase a home (thereby increasing the demand for, and prices of, homes). As I have shown and discussed in my scholarly research, the effect of interest rates on house prices was an international phenomenon, with the decline in global, long-term real interest rates largely explaining the concurrent rise in property prices in developed countries.[29]

18. The increase in home prices during this period was accompanied by a market-wide increase in mortgage debt. As shown in Exhibit 3, aggregate mortgage debt outstanding in the United States increased from approximately $4.5 trillion in early 2000 to $9.9 trillion by the end of 2006.

B.   Decline in Residential Real Estate Market Values and Macroeconomic Conditions

19. The U.S. economy and real estate market values deteriorated significantly from mid-2007 through 2009. Home prices fell precipitously, the unemployment rate increased, and

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[28] Federal Reserve Selected Interest Rates (Daily) – H.15, available at
http://www.federalreserve.gov/releases/h15/data.htm
[29] *See* Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis and Policy*: Vol. 9: Issue 3 (Symposium), Article 8, 2009, noting: ("It is important to understand the global context when considering the housing situation in the United States… Countries that experienced the highest rate of house price appreciation (Spain, France, the United States, Britain, and Australia) from 2001 to 2005 all had pronounced reductions in real mortgage rates" (p. 2); ("interest rate fluctuations must figure prominently in any explanation of movements in price/rent ratios") (Abstract).

mortgage delinquencies, defaults, and foreclosures subsequently increased.[30]   While the magnitude and severity of the crisis was largely unexpected, the relationship between economic conditions (particularly house prices) and loan performance was well understood prior to the crisis.[31]

i.   Decline in Real Estate Values

20. After peaking in June 2006, national home prices as measured by the Case-Shiller index started to decline, with a compound annual rate of decline of 4.4 percent through August 2007. From August 2007 to December 2009, the time period for when the loans at issue were originated, housing prices declined 26.3 percent, or a 12.3 percent compound annual rate. The market further declined by 7.4 percent between December 2009 and March 2012, but has since risen such that December 2012 housing prices are virtually the same as those in December 2009 (Exhibit 1).[32]   The rise and subsequent decline in house prices were not unique to the United States. A number of other developed countries, including Britain, Spain, and Australia experienced similar collapses in residential real estate markets.[33]

21. The magnitude of this decline in house prices was unprecedented and unexpected by the market. As shown in Exhibit 4, prior to 2006 through 2011, house prices in the United States had not fallen for two consecutive years, and had not declined more than 1.0

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[30] For a general discussion of the link between the housing market and macroeconomic conditions, *see* Hubbard, R. Glenn, and Anthony Patrick O'Brien, *Economics*, Pearson, Fourth Edition, 2013, pp. 808-811. *See also,* Hubbard, R. Glenn, Anthony Patrick O'Brien, and Matthew Rafferty, *Macroeconomics,* Pearson 2011.

[31] *See* Ambrose, Brent, Charles Capone, and Yongheng Deng, "Optimal Put Exercise: An Empirical Examination of Conditions for Mortgage Foreclosure," *Journal of Real Estate Finance and Economics*, 23, 2001.

[32] Prices declined 7.4 percent from December 2009 to March 2012, but as of December 2012, prices are only 0.3 percent higher than December 2009 levels.

[33] Hubbard, R. Glenn, and Christopher J. Mayer, "The Mortgage Market Meltdown and House Prices," *The B.E. Journal of Economic Analysis and Policy:* Vol. 9: Issue 3 (Symposium), Article 8, 2009, pp. 1-2.

percent in any single year, since 1945. In 2007 and 2008, house prices fell 8.4 percent and 18.4 percent, respectively, followed by declines of 2.5 percent in 2009, 3.8 percent in 2010, and 3.7 percent in 2011.[34] Professor William Goetzmann and his coauthors note that, prior to the decline, most models of expected house prices forecasted low probabilities of a crash in the near future, stating: "*Ex post*, these models were completely wrong. *Ex ante*, however, there was no consensus of model failure, even among professional economists."[35]

22. Such relatively optimistic expectations are echoed in a December 2006 report published by the Office of the Chief Economist at Freddie Mac, which states: "Nationally, house prices will likely appreciate around the rate of consumer price inflation, although there is a potential for real declines and some hard-hit areas will need greater improvements in the local economy before experiencing a housing recovery. With smaller price gains and reduced opportunities to extract equity, mortgage debt will grow more slowly. In short, housing markets will move off center stage, but will resume quietly providing homes and opportunities to build a nest egg for millions of American households."[36] According to the testimony of Fannie Mae's corporate representative, Marianne Sullivan, "Fannie Mae, at this point in time [2007], did not believe… that it would be as significant as we actually did experience in terms of market declines."[37]

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[34] Following the format in which the data are reported, price declines for each year reflect the decline from the fourth quarter of the previous year to the fourth quarter of the given year.

[35] Goetzmann, William N., Liang Peng, and Jacqueline Yen, "The Subprime Crisis and House Price Appreciation," NBER Working Paper Series, September 2009.

[36] Nothaft, Frank, Amy Crews Cutts, Calvin Schnure, and Nela Richardson, "December 2006 Economic Outlook: Anatomy of a Housing Recovery," Office of the Chief Economist at Freddie Mac, December 8, 2006, p. 1.

[37] Deposition of Marianne Sullivan, June 10, 2013, pp. 75-76.

23. Falling home prices reduced homeowners' equity (*see* Exhibit 5).[38] According to a report by CoreLogic, a provider of financial and real estate data, as of the end of December 2012, 21.5 percent of all residential properties in the U.S. with a mortgage had negative equity.[39] With negative equity, borrowers owe more than the value of their property. The concept of "negative equity" is sometimes referred to as homes being "under water." When a borrower's home is "under water," the borrower's ability to refinance or take out a larger mortgage is reduced if not eliminated. It has long been understood that negative equity also reduces borrowers' incentives to continue making required mortgage payments, resulting in higher mortgage delinquency, default, and foreclosure rates.[40]

24. Exhibit 6 shows that the total U.S. mortgage serious delinquency rate began increasing in late 2006, and continued to rise through the fourth quarter of 2009 as house prices fell. The rate increased from 2.2 percent in the first quarter of 2007 to 9.7 percent in the fourth quarter of 2009 and remains historically high at 6.8 percent as of the end of 2012. The U.S. subprime delinquency rate[41] increased even more dramatically, from 8.3 percent in the first quarter of 2007 to 30.6 percent in the fourth quarter of 2009. At the end of 2012, the U.S. subprime delinquency rate was still historically high at 21.7 percent.

25. States that have experienced larger declines in housing prices have also experienced a larger percentage of seriously delinquent loans. As shown in Exhibit 7, for all loans in

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[38] Exhibit 5 reports aggregate household equity as a percentage of aggregate real estate assets. When the percentage falls below 50 percent, aggregate household debt exceeds aggregate household equity. However, this statistic does not account for the distribution of equity across households.

[39] CoreLogic, "CoreLogic Reports 200,000 More Residential Properties Return to Positive Equity in Fourth Quarter of 2012," March 19, 2013.

[40] Ambrose, Brent, Charles Capone, and Yongheng Deng, "Optimal Put Exercise: An Empirical Examination of Conditions for Mortgage Foreclosure," *Journal of Real Estate Finance and Economics*, 23, 2001.

[41] Data on delinquency rates is from the Mortgage Bankers Association National Delinquency Survey. The criteria used to categorize prime and subprime loans are based on survey participants' reporting of what they consider to be their prime or subprime servicing portfolio, since internal servicing guidelines vary. [National Delinquency Survey Facts, May 2008]

the United States by state, this relationship between house prices and loan delinquencies is apparent for the period from August 2007 through December 2012. In addition, a number of empirical studies have shown the importance of house price declines in explaining delinquencies and foreclosures.[42]

ii.   Decline in Macroeconomic Conditions

26. The effect of declining home prices on mortgage delinquencies was compounded by increasing unemployment rates. After declining through most of 2004 through 2006, the national unemployment rate started to increase in the third quarter of 2007 and continued to increase through 2008 and 2009. Job loss is an important factor affecting a borrower's ability to pay his or her mortgage obligations. As illustrated in Exhibit 8, the U.S. mortgage serious delinquency rate increased contemporaneously with the unemployment rate. A study conducted by Freddie Mac on delinquent mortgage loans found that more than 40 percent of borrowers stated that unemployment (or reduced income) was the reason for the delinquency.[43] Exhibit 9 shows that, across all loans and all originators, states with larger increases in unemployment rates are experiencing higher rates of delinquency.

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[42] *See*, for example: Gerardi, Kristopher, Adam Hale Shapiro, and Paul S. Willen, "Decomposing the Foreclosure Crisis: House Price Depreciation versus Bad Underwriting," Federal Reserve Bank of Atlanta Working Paper 2009-25, September 2009 ("We find that had house prices not fallen, the foreclosure crisis would not have occurred, regardless of whether lenders had lowered underwriting standards (p. 25)"; Gerardi, Kristopher, Andreas Lehnert, Shane M. Sherlund, and Paul Willen, "Making Sense of the Subprime Crisis," Brookings Papers on Economic Activity, Fall 2008 ("We argue that the fall in home prices outweighs other changes in driving up foreclosures (p. 72)"; Demyanyk, Yuliya and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *Review of Financial Studies*, 24, 2011, ("The most important macroeconomic factor is the subsequent house price appreciation, measured as the metropolitan statistical area (MSA) level house price change between the time of origination and the time of loan performance evaluation…The only variable in the considered proportional odds model that contributed substantially to the crisis is the low subsequent house price appreciation for vintage 2006 and 2007 loans (pp. 1848-1880)").

[43] Mortgage Bankers Association, Policy Paper 2007-1, "Suitability – Don't Turn Back the Clock on Fair Lending and Homeownership Gains," February 2007, p. 24. The study was based on a sample of loans originated in 1999-2005 and delinquencies were evaluated as of Q3 2006.

27. As I describe in the following section, the unprecedented collapse in the real estate market and overall economy contributed to losses experienced by the loans sold by Countrywide to the GSEs, regardless of whether they were originated under the HSSL loan program.

VI.   ANALYSIS OF PERFORMANCE OF HSSL LOANS

28. In this section, I discuss the methodology and results of my analysis comparing the performance of the HSSL loans to that of comparable non-HSSL loans and comparable loans sold to the GSEs by all lenders.   Before controlling for loan and borrower characteristics, I find that the serious delinquency rate for PHSSL loans is 9.2 percent, compared to 20.3 percent for non-PHSSL loans. Similarly, the serious delinquency rate for DHSSL loans is 13.7 percent, compared to a rate of 18.1 percent for non-DHSSL loans.[44]   As I explain, it is important to control for differences in observable loan and borrower characteristics and changes in economic conditions when comparing the performance of different groups of loans.   When I do so, I continue to find that the performance of the HSSL loans is better than or similar to that of non-HSSL loans and to that of loans sold to the GSEs by all lenders, regardless of whether I use Plaintiff's or the Entity Defendants' definition of HSSL loans.

29. I describe my analysis in detail in the following section. First, I describe various loan and borrower characteristics that have been found to explain differences in loan performance.

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[44] I calculate the serious delinquency rate as the percentage of loans that were 90 or more days delinquent or liquidated as of December 2012. If instead, I calculate the serious delinquency rate using Dr. McFadden's measure (that is, the percentage of loans that were ever 90 days delinquent) and performance data, I find that the serious delinquency rate for PHSSL loans is 14.5 percent, compared to a rate of 31.1 percent for non-PHSSL loans. Similarly, using Dr. McFadden's measure, the serious delinquency rate for DHSSL loans is 21.5 percent, compared to a rate of 27.9 percent for non-DHSSL loans. The reason for these differences is that Dr. McFadden's performance measure does not account for the possibility that a loan that is at one point 90 days delinquent may prepay or return to a current or less delinquent status as of December 2012.

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Second, I use Dr. McFadden's own logit regression model to compare the performance of HSSL and non-HSSL loans. Third, I develop an alternative model that, similar to Dr. McFadden's duration model, captures a borrower's monthly decision to default rather than modeling loan performance at a single point in time. I use this model (known as a panel logit model) to compare the performance of the HSSL loans to that of non-HSSL loans, and to that of loans sold to the GSEs by all lenders. Using either Dr. McFadden's logit model or my own panel logit model, I find that the performance of HSSL loans is similar to or better than that of comparable non-HSSL loans. Furthermore, using my own panel logit model, I find that the performance of HSSL loans is better than that of comparable loans sold to the GSEs by all lenders. These findings undercut Plaintiff's allegations regarding Countrywide's underwriting practices for HSSL loans.

A.   Factors Impacting Loan Performance

30. Loan and borrower characteristics associated with the likelihood of delinquency or default affect loan performance. For example, all else being equal, a borrower with a lower credit score is more likely to become delinquent on a loan than a borrower with a higher credit score. In addition, differential economic conditions such as house prices and unemployment rates across geographical locations can impact loan performance. As such, simply comparing the default and delinquency behavior of two loans may be insufficient because the loans may have characteristics that would be expected to result in different performance.

31. In order to account for the factors affecting default and delinquency, a regression model can be used to estimate the relationship between loan performance (the "dependent variable") and a set of independent variables (also known as explanatory variables) that

are relevant predictors of performance.[45] As supported by academic research and a more detailed discussion in Exhibit 10, factors relevant for assessing risk and explaining default include equity in the home,[46] loan size, loan purpose (for example, for purchase or refinancing), origination year, debt-to-income ratio, credit score, loan documentation, residency (for example, primary residence versus second home), and property type (for example, single family versus condominium).   These factors, as well as the macroeconomic factors identified above (that is, changes in house prices and unemployment rates) are among the independent variables used in my regression analysis.[47] Dr. McFadden recognizes the importance of each of these loan and borrower characteristics in explaining loan performance.   His models include versions of all of these factors.

B.   Comparison of HSSL and Non-HSSL Performance Using Dr. McFadden's Model

32. In his expert report, Dr. McFadden presents a series of regression models in which he estimates the relationship between loan performance, as measured by the occurrence of a 90+ day delinquency, and certain of Mr. Holt's defect findings as well as the use of loan specialists, while controlling for various loan and borrower characteristics and changes in house prices.[48]   While not stated as a purpose of his analysis,[49] Dr. McFadden's

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[45] It is common to refer to these independent variables as "controls" because they allow a researcher to take into account, or control for, differences between the pools or loans that are expected to impact performance.

[46] Equity is calculated as 100 percent minus the house-price-adjusted CLTV ratio. For example, if the house-price-adjusted CLTV ratio is 75 percent, equity is equal to 25 percent (100 minus 75 percent).

[47] For a complete description of the independent variables used in my regression models, *see* Exhibit 10.

[48] Dr. McFadden's model includes a house price ("HPI") variable that measures the "proportion change in the price of a representative single family home in that property's zip code during the year following loan origination." [Corrected McFadden Report, ¶ 16]

[49] Dr. McFadden describes his analysis as addressing the following questions: "Did underwriting defects generally lead to higher probabilities of delinquency?; Did permitting employees known as 'loan specialists' to approve loans as 'cleared to close' increase the probability of loan delinquencies?; [and] Did underwriting defects and the use of

regression models can also be used to compare the performance of HSSL and non-HSSL loans. Given the models' capability to address this question, and the fact that this question is fundamental for evaluating the allegations at issue, it is surprising that Dr. McFadden omits any discussion of the relative performance of HSSL and non-HSSL loans.

33. In order to assess the relative performance of PHSSL and non-PHSSL loans, I re-estimate the first model reported in Table 7 of the Corrected McFadden Report, but exclude the defect count variables ("1 Categ. Underwriting Prob." and "2+ Categ. Underwriting Prob.") and expand the set of observations to include the population of PHSSL and non-PHSSL loans rather than restricting the observations to the sample loans. Hypothetically, to the extent PHSSL and non-PHSSL loans have different defect rates, and to the extent the presence of defects affects loan performance, the defect count variables may explain part of the difference in the relative performance of PHSSL and non-PHSSL loans. By excluding the defect count variables from the model, I am able to isolate the difference in performance, controlling for loan and borrower characteristics and changes in house prices, in the estimated coefficient for the "PHSSL" variable. As reported in Exhibit 11A, the estimated coefficient on the PHSSL variable is negative, indicating that PHSSL loans are less likely to become delinquent than non-PHSSL loans. This difference in relative performance is strongly statistically significant (p-value of 0.003). I perform the same analysis using the Entity Defendants' definition of HSSL loans and find the estimated coefficient on the DHSSL variable is positive. However, this coefficient is not statistically significant (p-value of 0.119) (*see* Exhibit 11B).

'loan specialists' lead to higher probabilities of delinquency specifically among HSSL loans?" [Corrected McFadden Report, ¶ 8]

34. Thus, contrary to Plaintiff's claim, Dr. McFadden's own logit model establishes that the likelihood of delinquency is, if anything, lower for HSSL loans than for non-HSSL loans, after controlling for loan and borrower characteristics and changes in house prices.

C.   Comparison of HSSL and Non-HSSL Performance Using Alternative Model

35. Another approach for evaluating the relative performance of HSSL and non-HSSL loans is to estimate a dynamic rather than static logit model. In the loan performance setting, a dynamic choice model, such as a duration or panel logit model,[50] captures period-by-period decisions by borrowers to prepay, remain current, or become delinquent or default.[51] In contrast, Dr. McFadden's logit model only considers loan performance at a single point in time. Dr. McFadden estimates a duration model as well and acknowledges the benefits of duration models and the fact that these models have been commonly used in similar settings: "Earlier proceedings on similar matters have used duration models to determine the probabilities that loans will reach delinquent status at each duration after date of origination. This model is appropriate when the loans have very different dates of origination, and where the data terminate before a substantial number of delinquencies are realized."[52] The conditions Dr. McFadden describes apply to the loans considered

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[50] Duration and panel logit models yield virtually equivalent results when the observations occur at sufficiently short time intervals. *See* Allison, Paul D., "Discrete-Time Methods for the Analysis of Event Histories", *Sociological Methodology*, Vol. 13, 1982, p. 73: "In practice, however, the difference between the two models is likely to be trivial. The smaller the time interval, the smaller the difference will be because as the interval width becomes smaller, the logistic [panel logit] model converges to the proportional hazards [duration] model."

[51] *See,* for example, *Handbook of Econometrics, Volume II,* Edited by Z. Griliches and M.D. Intriligator, Elsevier Science Publishers, "Chapter 24: Econometric Analysis of Qualitative Response Models", Daniel L. McFadden, p. 1433: "Dynamic models: Many important economic applications of qualitative response models involve observations through time, often in a combined cross-section/time-series framework."; *see also* Agarwal, Sumit, Brent W. Ambrose, Souphala Chomsisengphet, and Chunlin Liu, "An empirical analysis of home equity loan and line performance," *Journal of Financial Intermediation*, 15, 2006, p. 450: "[T]he standard approach in empirical mortgage modeling recognizes the ability of the borrower to terminate the mortgage through either prepayment or default in a competing risks hazard framework."

[52] Corrected McFadden Report, ¶ 29.

here, which were originated between January 2006 and November 2009, with a significant portion not becoming seriously delinquent prior to December 2012. Duration models allow one to capture the contemporaneous relationship between loan performance and time-varying economic factors.[53]

36. The panel logit model I develop here estimates the probability of default and prepayment in each month for each loan, conditional on neither event having occurred in a previous month, accounting for disclosed loan characteristics and economic conditions such as house prices and unemployment rates in that month. The dependent variable reflects one of three possible loan statuses: prepaid, current, or serious delinquency.[54] I obtain loan characteristics data from Countrywide. These characteristics (that is, the controls or independent variables in my regression analysis) include documentation type, credit score, CLTV ratio, debt-to-income ratio, original loan balance, property type, loan purpose, occupancy type, and origination year. In addition, my analysis controls for changes in economic conditions by including the estimated equity in the homes and the change in the unemployment rate as independent variables. Exhibit 12 provides definitions for each of the variables in my regression analysis. I chose the independent variables based on academic research examining the riskiness of loans and predictors of default. Dr. McFadden includes a very similar set of variables in his regression analyses.

37. Using this model, I estimate the relationship between loan performance and loan and borrower characteristics and macroeconomic conditions for the non-HSSL loans. I use

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[53] *See,* for example, *Structural Analysis of Discrete Data and Econometric Applications*, Edited by Charles F. Manski and Daniel L. McFadden, Cambridge: The MIT Press, 1981, "Chapter 3: Statistical Models for Discrete Panel Data", James J. Heckman, p. 114: "The [dynamic] model is sufficiently flexible to accommodate time-varying explanatory variables…and complex structural economic interrelationships among decisions taken at different times."

[54] Serious delinquency is measured as a loan being 90 days delinquent or more, or liquidated.

those estimated relationships to predict the performance of the HSSL loans. I then

compare the predicted performance to the actual performance of HSSL loans as of

December 2012. As I describe below, using either definition of HSSL loans, I find that

the performance of the HSSL loans is not statistically different from that of non-HSSL

loans.

i.   Benchmarking HSSL Performance Against Non-HSSL Performance

38. As introduced above, my regression model estimates the relationship between loan

performance (that is, the occurrence of serious delinquency and default, or prepayment)

and loan characteristics and macroeconomic conditions for the population of non-HSSL

loans.

39. Exhibit 13-A1 reports the regression results showing the estimated impact of loan and

borrower characteristics on loan performance for non-PHSSL loans. Exhibit 13-A2

demonstrates how the likelihood of default is affected by changes in the unemployment

rate and housing prices (as captured by the equity variable).[55] Exhibits 13-B1 and 13-B2

report the estimated relationships for non-DHSSL loans.

40. I use the coefficients from the model estimated using the non-HSSL loans to calculate

what I term the "expected" default rates for the HSSL loans. This measure can be

thought of as the expected performance of the HSSL loans, assuming they performed like

the non-HSSL loans, after controlling for loan characteristics and changing economic

conditions. I then aggregate the expected performance of each loan to arrive at the

expected performance for the entire population of HSSL loans. If the HSSL loans have a

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[55] Equity and unemployment are highly correlated (that is, related), making it difficult to simultaneously estimate the effects of both variables on loan performance. Creating indicator variables by quartiles of equity and unemployment is an alternative way to estimate the relationship between macroeconomic conditions and loan performance.

lower cumulative default rate than expected, it indicates that the HSSL loans performed better than the non-HSSL loans, given their characteristics.

41. I find an expected default and serious delinquency rate of 9.2 percent for the PHSSL loans, based on the performance of the non-PHSSL loans. The actual default and serious delinquency rate for PHSSL loans as of December 2012 is 9.0 percent. The difference between actual and expected performance is not statistically significant. I therefore conclude that the performance of the PHSSL loans is on par with that of the non-PHSSL loans, after controlling for loan characteristics and changes in economic conditions. For DHSSL loans, the expected default and serious delinquency rate is 13.3 percent. The actual default and serious delinquency rate for DHSSL loans is 13.5 percent. The difference between actual and expected performance is not statistically significant.

ii. Benchmarking HSSL Performance Against Performance of Loans Sold to GSEs by All Lenders

42. Another relevant comparison group is loans sold to the GSEs by all lenders. In order to evaluate the performance of the HSSL groups relative to this benchmark, I use the same panel logit model as described above. I estimate the relationship between loan performance and loan and borrower characteristics and macroeconomic conditions for the comparable loans sold to the GSEs by all lenders.[56] I use those estimated relationships to predict the performance of the HSSL loans. I compare the predicted performance to the actual performance of HSSL loans as of December 2012. As I describe below, using

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[56] Data on comparable loans come from CoreLogic. I am unable to identify HSSL loans in the CoreLogic database. However, these loans comprise, at most, only approximately 8 percent of the GSE loans included in the benchmark using Plaintiff's definition and, at most, only approximately 2 percent using the Entity Defendants' definition. For a complete description of the identification of comparable loans, *see* Exhibit 12.

either definition of HSSL loans, I find that HSSL loans have performed better than comparable loans sold to the GSEs by all lenders.

43. Exhibit 14A reports the regression results showing the estimated impact of loan and borrower characteristics on loan performance for loans sold to the GSEs by other lenders. Exhibit 14B demonstrates how the likelihood of default is affected by changes in the unemployment rate and housing prices.

44. I use the coefficients from the model estimated using the loans sold to the GSEs by all lenders to calculate what I term the "expected" default rates for the PHSSL and DHSSL loans. I find an expected default and serious delinquency rate of 10.0 percent for the PHSSL loans, based on the performance of the GSE loans. The difference between the actual default and serious delinquency rate for PHSSL loans of 9.0 percent as of December 2012 and expected performance is statistically significant. Similarly, I find an expected default and serious delinquency rate of 14.6 percent for the DHSSL loans, compared to an actual default and serious delinquency rate of 13.5 percent as of December 2012. Again, this difference is statistically significant. I therefore conclude that, regardless of the definition I use, the performance of the HSSL loans is better than that of loans sold to the GSEs by all lenders, after controlling for loan characteristics and changes in economic conditions.

VII. EVALUATION OF DR. COWAN'S ANALYSIS

45. In his report, Dr. Cowan describes his methodology for selecting the sample of loans to be re-underwritten by Mr. Holt. I understand Dr. Barnett evaluates Dr. Cowan's methodology and its implications in his report. In brief, Dr. Cowan stratified the population of loans by four variables (PHSSL, default, LTV, and FICO score), selected a

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sample of 1,000 loans disproportionately from these strata, and passed the loans onto Mr. Holt for re-underwriting.[57] Mr. Holt's team of re-underwriters reviewed a total of 865 of these 1,000 sampled loans. Dr. Cowan then used Mr. Holt's results to draw various conclusions about the population of loans. As I describe below, Dr. Cowan's conclusions are flawed and/or incomplete in a number of ways.

A. Dr. Cowan and Plaintiff's other experts fail to test whether HSSL loans have a higher Material Defect rate than non-HSSL loans

46. Dr. Cowan describes his selection of separate samples from the PHSSL and non-PHSSL loan populations as allowing him "to draw accurate conclusions about the underwriting quality of the loans in the HSSL program and to compare it against the underwriting practices outside the HSSL program."[58] Similarly, he states that "[t]he reasoning behind stratification based on HSSL, Default, and LTV is to make reasonable and justifiable comparisons between the findings of the re-underwriting comparing similar HSSL/Non-HSSL clusters of loans, e.g., defective rate for HSSL-Default-LTV<80% loans vs. defective rate for Non-HSSL-Default-LTV<80% loans."[59] It is therefore surprising that Dr. Cowan and Plaintiff's other experts entirely omit any such comparisons from their reports.

47. Using Mr. Holt's re-underwriting results, I have made such a comparison.[60] Specifically, I compare the overall defect rates of PHSSL and non-PHSSL loans as well as the defect rates of paired PHSSL and non-PHSSL strata (for example, I compare the defect rate for

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[57] Cowan Report, ¶ 5.
[58] Cowan Report, ¶ 5.
[59] Cowan Report, ¶ 50.
[60] As I note above, Mr. Holt only reviewed 865 of the 1,000 sample loans selected by Dr. Cowan. Dr. Cowan provides no support that his findings would be unchanged had Mr. Holt reviewed all 1,000 sample loans. For the purpose of this analysis, I compare the defect rates for the 865 sample loans re-underwritten by Mr. Holt.

defaulted PHSSL loans with LTV ratios less than 80 percent to that for defaulted non-PHSSL loans with LTV ratios less than 80 percent). My results are shown in Exhibit 15. First, I find that the overall defect rate of PHSSL loans (30.8 percent, properly weighted to account for Dr. Cowan's stratification by default status, LTV ratio, and FICO score)[61,62] is statistically significantly *less than* the defect rate of non-PHSSL loans (40.0 percent, properly weighted to account for Dr. Cowan's stratification by default status, LTV ratio, and FICO score).[63]   Second, I find that, within paired strata, there are no statistically significant differences in the defect rates of PHSSL and non-PHSSL loans. In the two cases in which the difference in defect rates is the closest to being statistically significant (Cowan Strata 3 & 4 and Cowan Strata 7 & 8), the defect rate of non-PHSSL loans is higher. Thus, the evidence demonstrates that PHSSL loans are in fact less likely than non-PHSSL loans to be Materially Defective based on Mr. Holt's review.

B. Dr. Cowan's finding that the default rate is significantly higher for Holt Materially Defective loans is fundamentally flawed

48. Dr. Cowan goes on to analyze Mr. Holt's results "to determine whether a relationship exists between defects and default rates" in the sample of HSSL loans.[64]   Dr. Cowan

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[61] For example, the percentage of defaulted loans with an LTV ratio less than 80 percent and for which the FICO score is in the lowest stratum (that is, a FICO score between 506 and 616) is 1.5 percent in the population of PHSSL loans. I multiply Mr. Holt's estimated defect rate for the sample loans in this stratum by a weight of 1.5 percent when aggregating defect rates across strata to calculate the estimated overall defect rate in the PHSSL population.
[62] My estimated defect rate of 30.8 percent differs slightly from that reported by Dr. Cowan (30.6 percent). [Cowan Report, ¶ 72] This difference occurs because Dr. Cowan assumes the distribution of FICO scores among the sample loans is proportional to the distribution among the population of loans. In fact, the lower and upper bounds for the FICO score quintiles do not create exactly equally sized categories and the fact that Mr. Holt did not review the full sample of 600 PHSSL loans exacerbates the disproportionality. My estimated defect rate takes into account the disproportional nature of the sample by adjusting the weights applied to the defect rates within each of the stratum.
[63] I compared the defect rates of PHSSL and non-PHSSL loans using a *z*-test of equality.
[64] Cowan Report, ¶ 73.

concludes that "[t]he default rate is significantly higher for materially defective loans" in the PHSSL sample and that the difference is statistically significant.[65]

49. Dr. Cowan's analysis is fundamentally flawed because he fails to consider known risk characteristics that may be responsible for the relationship between Holt Material Defects and loan performance that he observes in the data. As discussed above, it is well known that certain loan and borrower characteristics (for example, CLTV ratios, DTI ratios, FICO scores, loan amounts, and so on) affect loan performance. Plaintiff's expert Dr. McFadden recognized as much in his report, as he included these variables and many others in his econometric model of loan performance.[66]

50. To evaluate whether the same risk characteristics that are associated with default are also associated with Holt Material Defects, I compare the characteristics of Holt Materially Defective loans to the characteristics of Holt Non-Materially Defective loans. I report these comparisons in Exhibit 16. I find that, on average, Holt Materially Defective loans have larger principal balances, higher CLTV ratios, higher DTI ratios, and lower FICO scores. They are also more likely to be investment properties.[67] In other words, Holt Materially Defective loans have riskier characteristics than Holt Non-Materially Defective loans.

51. Thus, it is no surprise that the Holt Materially Defective loans have a higher default rate. Dr. Cowan's disregard of such factors renders his comparison of default rates essentially meaningless, as he fails to consider differences in disclosed risk characteristics between Holt Materially Defective and Non-Materially Defective loans that are likely to affect

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[65] Cowan Report, ¶¶ 76-77. Dr. Cowan tests for statistical significance using a Chi-square test.
[66] Corrected McFadden Report, ¶ 19 and Table 7.
[67] All these differences are statistically significant at the 95 percent confidence level.

default risk. As I describe below, when I properly control for factors affecting loan performance, I find, if anything, only a marginally statistically significant relationship between Holt Material Defects and the probability of serious delinquency among all sample loans. For PHSSL loans in particular, I do not find a statistically significant relationship between Holt Material Defects and the probability of serious delinquency.

VIII. EVALUATION OF DR. MCFADDEN'S ANALYSIS

A. Dr. McFadden fails to directly evaluate the relationship between Holt Material Defects and loan performance

52. As described above, Dr. Cowan's analysis of the difference in default rates for Holt Materially Defective versus Holt Non-Materially Defective loans fails to properly account for loan and borrower characteristics that affect loan performance. While Dr. McFadden's analysis controls for risk characteristics, he fails to directly evaluate the impact of Holt Material Defects on loan performance. Instead, Dr. McFadden takes a circuitous and ultimately misleading approach. He first tests which of Mr. Holt's nine Agency Defect categories increases the probability of serious delinquency (*see* Corrected McFadden Report, Table D2).[68] In the regressions reported in Table 7 of Dr. McFadden's report, he only considers the five Agency Defects for which he finds a positive relationship between the defect category and the probability of serious delinquency when calculating the count of defects for each loan (the "1 Categ. Underwriting Prob." and "2+ Categ. Underwriting Prob." defect count variables).[69] His

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[68] Mr. Holt's Agency Defect categories are Documentation Defects, Misrepresentation Defects, Eligibility Defects, Property Eligibility Defects, Property Defects, AUS Defects, Income Defects, Credit Defects, and Asset Defects. *See* Corrected McFadden Report, Appendix D and Holt Report, p. 18.
[69] The five Agency Defects included in Dr. McFadden's defect count variables are Misrepresentation Defects, Property Eligibility Defects, AUS Defects, Income Defects, and Credit Defects.

conclusions regarding the impact of Mr. Holt's defect findings on loan performance are based on the estimated coefficients for these defect count variables rather than on a direct test of the relationship between Holt Material Defects and serious delinquency.

53. This approach ensures the analysis will be biased in favor of finding a positive relationship between Dr. McFadden's subset of defects and serious delinquency because it excludes by construction the defects identified by Mr. Holt that are not positively associated with delinquency. This approach is similar to a student getting 50 questions wrong out of 100 and deciding in determining his grade to only count the questions he got right so that he could claim a score of 50 out of 50.

54. In fact, Dr. McFadden's analysis *confirms* that some of the defects identified by Mr. Holt (Documentation Defects, Property Defects, and Asset Defects) have a *negative* effect on the probability of serious delinquency and that nearly all of the defects identified by Mr. Holt (all except Automated Underwriting System ("AUS") Defects) are not statistically significantly related to the probability of serious delinquency at the 95 percent confidence level.[70] Dr. McFadden finds that four of Mr. Holt's Agency Defects (Misrepresentation Defects, Property Eligibility Defects, AUS Defects, and Credit Defects) have a positive and statistically significant relationship with serious delinquency at the 90 percent confidence level.

55. Dr. McFadden's approach creates a fundamental inconsistency between his own defect measures and Mr. Holt's re-underwriting findings. For example, there are instances where Mr. Holt identifies a loan as being Materially Defective, while Dr. McFadden's

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[70] I understand Dr. Mason uses Mr. Holt's Material Defect findings to calculate losses despite the fact that Dr. McFadden has shown that a subset of Mr. Holt's Agency Defect findings are not, in fact, positively correlated with the probability of serious delinquency, let alone statistically significantly related to serious delinquency.

count of defects for the loan is equal to zero.[71] This discrepancy arises because there are

loans with Documentation, Property, Eligibility, or Asset Defects (and none of the five

Agency Defects considered by Dr. McFadden) that are found to be Materially Defective

by Mr. Holt. Dr. McFadden, however, excludes these categories from his defect count

measures. Similarly, there are loans with the Agency Defects Dr. McFadden finds to be

positively and at least marginally statistically significantly correlated with serious

delinquency (Misrepresentation Defects, Property Eligibility Defects, AUS Defects, and

Credit Defects) that are not identified as Material Defective by Mr. Holt.[72] Thus,

Plaintiff's own experts disagree on which defects are in fact "material" to the credit risk

of the loans.

56. To directly assess the impact of Holt Material Defects on the probability of serious

delinquency and to illustrate the misleading nature of Dr. McFadden's analysis, I adjust

Dr. McFadden's regression models by replacing the defect count variables with a

material defect flag based on Mr. Holt's re-underwriting findings. I make no other

changes to the data or to Dr. McFadden's regression models. Exhibits 17A and 17B

report my results. Using Dr. McFadden's logit model, I find a positive, but only

marginally statistically significant coefficient (*p*-value of 0.069) on the material defect

variable (*see* Exhibit 17A). Using Dr. McFadden's duration model, I find a positive, but

statistically insignificant coefficient (*p*-value = 0.110) on the material defect variable (*see*

Exhibit 17B). Dr. McFadden acknowledges the appropriateness of a duration model for

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[71] Data provided as backup to Holt Report, "2013.05.02 Final Data File.csv." My evaluation is based on the Agency Defect flags ("Agency_1", "Agency_2", etc.) and the Holt Material Defect flag ("IQ").
[72] *Id.*

this application,[73] and as discussed above, academic researchers consider a duration model to be a standard approach in the loan performance setting.[74] These results indicate that there is not a statistically significant relationship between Holt Material Defects and the occurrence of serious delinquency at the confidence level standard set by Plaintiff's expert, Dr. Cowan (that is, the 95 percent confidence level).

57. I also use Dr. McFadden's models to evaluate the relationship between Holt Material Defects and loan performance for PHSSL loans in particular by adding interaction terms between the PHSSL variable and the material defect variable. As shown in Exhibit 17C, using Dr. McFadden's logit model, I find a positive, but statistically insignificant coefficient (p-value = 0.363) on the interaction term between PHSSL and material defect ("PHSSL and Material Defect"). Similarly, using Dr. McFadden's duration model, I find a positive, but statistically insignificant coefficient (p-value = 0.207) on the interaction term between PHSSL and material defect (*see* Exhibit 17D). Therefore, regardless of which of Dr. McFadden's regression models I use, I find that there is not a statistically significant relationship between Mr. Holt's material defect findings and the probability of serious delinquency for PHSSL loans.

B. Dr. McFadden's regression models and my analysis of defect rates across re-underwriters suggest that Mr. Holt's re-underwriting findings are unreliable

58. These findings call into question the reliability of Mr. Holt's re-underwriting results. Loans he identified as being Materially Defective, and therefore as allegedly having materially increased credit risk, are not statistically significantly more likely to become

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[73] Corrected McFadden Report, ¶ 29.

[74] *See,* for example, Agarwal, Sumit, Brent W. Ambrose, Souphala Chomsisengphet, and Chunlin Liu, "An empirical analysis of home equity loan and line performance," *Journal of Financial Intermediation,* 15, 2006, p. 450.

seriously delinquent than Non-Materially Defective loans at the 95 percent confidence level, the confidence level standard set by Plaintiff's expert, Dr. Cowan. It would therefore be inappropriate to use Mr. Holt's findings to calculate losses since Plaintiff's experts have not adequately established that Holt Material Defects have caused losses for the HSSL loans.

59. Further calling into question the reliability of Mr. Holt's re-underwriting results, I find evidence of inconsistent judgment being applied by Mr. Holt's re-underwriters. The underwriting and re-underwriting processes are inherently subjective. Mr. Holt acknowledges as much, writing that "underwriting involves an exercise of judgment."[75] Due to this subjectivity, the methodology by which loans are assigned to particular re-underwriters can have a substantial impact on the reliability of the re-underwriting exercise and ultimately the defect findings. Nonetheless, Mr. Holt omits from his Expert Report any description of how loans were assigned to re-underwriters. Mr. Holt merely states that he "assigned the loans to [his] team of re-underwriters for first-level re-underwriting."[76] In Mr. Holt's deposition, he describes an essentially random process for the assignment of loans to re-underwriters, stating "[m]y assistant… would just assign the loans out… there's no science to it."[77]

60. If loans were assigned randomly, and if the re-underwriters evaluated loans using consistent criteria, one would expect to find consistency in the defect rates across re-underwriters.[78] I do not find this to be the case. Rather, both before and after controlling

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[75] Holt Report, p. 5.
[76] Holt Report, p. 15.
[77] Deposition of Ira Holt, Jr., June 11, 2013, p. 88.
[78] Some variation would be expected due to chance, but I would not expect those differences to be statistically significant.

for a variety of loan and borrower characteristics, I find statistically significant

differences in the defect rates across the members of Mr. Holt's re-underwriting team.

These findings highlight the subjectivity of the re-underwriting exercise and point to the

unreliability of Mr. Holt's results.[79]

61. I was able to identify individual re-underwriters and the loans they reviewed using Mr.

Holt's backup materials. According to Mr. Holt, the re-underwriting process involved a

staff of 19 re-underwriters, including himself.[80] The number of loans reviewed by each

of the 19 re-underwriters varies considerably, from 1 to 143 loans (*see* Exhibit 18). The

defect rates across the re-underwriters range from zero percent to 100 percent.

Considering only those re-underwriters who reviewed more than 30 loans, the defect

rates range from 23.8 percent to 67.4 percent and the differences in these defect rates are

statistically significant. If loan files were in fact assigned to re-underwriters randomly,

these findings provide evidence of inconsistent judgment being applied by different re-

underwriters.

62. In his deposition, Mr. Holt describes a quality control process in which he compared

defect rates across re-underwriters.[81]   While Mr. Holt testifies that the process of

assigning loans to re-underwriters was essentially random,[82] he acknowledges that re-

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[79] Note that I find inconsistencies across re-underwriters even though Mr. Holt states that he "personally carried out quality control (or second-level review testing) on virtually all of the loans that were re-underwritten" and provided daily supervision of his re-underwriting team. [Holt Report, p. 15] When asked in his deposition how often he would change a recommendation made by a re-underwriter, Mr. Holt responded: "There wasn't much in the way of changes, no. More of the content of what was found." [Deposition of Ira Holt, Jr., June 11, 2013, pp. 326-327]

[80] Holt Report, p. 15. I identified the 19 different re-underwriters using the "UWID" variable in Mr. Holt's backup data. [2013.05.02 Final Data File.csv]

[81] "Q: Did you analyze the material defect rates that your other underwriters were reaching on the loans that they were reviewing? A: Yes. Part of the [Quality Control] is to see if everybody is coming up with similar responses or there's any deviations because they can go back to insuring [sic] that we're analyzing and understanding the guidelines correctly…" [Deposition of Ira Holt. Jr., June 11, 2013, p. 101]

[82] Deposition of Ira Holt, Jr., June 11, 2013, p. 88.

underwriters may have been assigned different types of loans and that this needs to be considered when comparing defect rates across re-underwriters.[83] If different re-underwriters reviewed loans with different characteristics (for example, if one re-underwriter was primarily assigned full documentation loans, while another was primarily assigned reduced documentation loans), one would not expect to find consistency in the *uncontrolled* defect rates across re-underwriters. Instead, one would expect to find consistency in the defect rates across re-underwriters after controlling for observable loan characteristics such as documentation type.

63. To evaluate the consistency of defect rates across re-underwriters controlling for observable loan characteristics, I estimate a regression model. The dependent variable is a defect indicator equal to one for Holt Materially Defective loans and equal to zero for Holt Non-Materially Defective loans. The control variables include a variety of borrower and loan characteristics (for example, CLTV ratio, FICO score, documentation type, loan purpose, property type, origination year, state), and an indicator variable for each re-underwriter. Given Plaintiff's claim that loans approved by loan specialists were more likely to be defective, I also include a variable indicating whether a loan was approved by a loan specialist as defined by Dr. McFadden.[84]

64. If the assignment of loans across re-underwriters varied based on any of the characteristics included in the regression model, one would expect to find no statistical difference in the estimated coefficients for the re-underwriter indicator variables. On the

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[83] "[W]e look at what every underwriter is doing, but you also have to take it a step further and look at, okay, what type of loans did they get? What kind of doc types did they get?" [Deposition of Ira Holt, Jr., June 11, 2013, p. 101]

[84] Complaint, ¶¶ 76, 81. *See* Corrected McFadden Report, Appendix C: "The loan specialist review flag identifies loans in which the 'SM_PC3_Title' column from the loan database contains the phrase 'Loan Specialist'. The loan data glossary describes the 'SM_PC3_Title' column as 'Person who moved the loan from Phase Code 2 (approval) to Phase Code 3 (pre closing)'." Following this methodology, I consider a loan to have been reviewed by a loan specialist if the "SM_PC3_Title" variable in Dr. McFadden's data contains the phrase "Loan Specialist."

contrary, I find that the differences in the re-underwriter defect rates, controlling for the loan and borrower characteristics included in the model, are statistically significant. In particular, I test whether the estimated odds ratios on the re-underwriter indicator variables are equal (that is, whether the odds of finding a Material Defect are statistically different after controlling for loan and borrower characteristics). I find that they are not equal (*p*-value of zero) (*see* Exhibit 19). I also find that the estimated odds ratio on the "Loan Specialist" variable is less than one. Contrary to Plaintiff's claims, this indicates that, after controlling for various loan and borrower characteristics, loans approved by a loan specialist are *less* likely to be found Materially Defective by Mr. Holt than loans that were approved by an underwriter. However, this estimated odds ratio is not statistically significant (*p*-value of 0.26 in Model A and *p*-value of 0.44 in Model B).

65. Together with the absence of a statistically significant relationship between Holt Material Defects and loan performance, the evidence of inconsistent judgment being applied across re-underwriters further calls into question the reliability of Mr. Holt's defect findings. Dr. Cowan, Dr. McFadden, and Dr. Mason directly rely on Mr. Holt's re-underwriting findings in conducting their respective analyses. To the extent Mr. Holt's re-underwriting results are unreliable, the conclusions Dr. Cowan, Dr. McFadden, and Dr. Mason draw from these analyses may therefore also be unreliable and misleading.

C. Dr. McFadden's "scenario analysis" is flawed and misleading

66. Using the results from his logit regression, Dr. McFadden conducts a "scenario analysis" in which he purports to calculate the change in the number of seriously delinquent PHSSL loans in a counterfactual scenario. In this counterfactual scenario, he assumes PHSSL loans are neither defective (that is, have zero defects according to his defect

measure, which is the count of defects for each loan when only considering the five Agency Defects for which Dr. McFadden found a positive relationship with the probability of serious delinquency) nor approved by a loan specialist. Dr. McFadden claims that 2,773 PHSSL loans would not have become seriously delinquent had they not been defective and an additional 1,805 PHSSL loans would not have become seriously delinquent had they not been approved by a loan specialist, for a total serious delinquency count change of 4,668 PHSSL loans.[85]   In his deposition, Dr. McFadden describes these results as "simply [giving] an indication that this elevated risk from these flaws was economically significant."[86] He goes on to say that "[i]f [he] were using these analysis [sic] for [his] own damage estimates… [he] would be concerned with how sensitive this is."[87]

67. In addition to McFadden's own caveats regarding the implications of his scenario analysis, his findings are misleading for other reasons. First, Dr. McFadden's scenario analysis suffers from the same issue described above. Instead of estimating the change in the number of seriously delinquent loans in the counterfactual scenario in which none of the loans have Holt Material Defects, Dr. McFadden instead estimates the change in the number of seriously delinquent loans based on his alternative defect measure. By construction, this alternative defect measure ensures a strong relationship is found between defects and the probability of serious delinquency. Second, Dr. McFadden's performance measure (ever 90 days delinquent) does not measure loans that ultimately

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[85] Corrected McFadden Report, ¶ 27.
[86] Deposition of Dr. Daniel L. McFadden, June 11, 2013, p. 50.
[87] Deposition of Dr. Daniel L. McFadden, June 11, 2013, pp. 50-51.

result in a loss because not all loans that become 90 days delinquent remain delinquent or default.

IX. CONCLUSION

68. My findings undercut Plaintiff's allegations. Had the HSSL loans been originated using poorer underwriting standards than those used for non-HSSL loans or loans originated by other lenders, one would expect the loans to have experienced a higher level of default and serious delinquency. In fact, just the opposite is true. I find that HSSL loans have performed as well as or better than non-HSSL loans both before and after accounting for the disclosed characteristics of the loans and macroeconomic conditions. This conclusion holds regardless of whether I use Dr. McFadden's models or my own, and regardless of whether I use Plaintiff's definition of HSSL loans or the Entity Defendants' definition. In addition, I find that both PHSSL and DHSSL loans have performed better than comparable loans sold to the GSEs by all lenders, after controlling for disclosed loan characteristics and changes in macroeconomic conditions.

69. Not only is the performance of HSSL loans better than or on par with that of non-HSSL loans, but based on Mr. Holt's re-underwriting results, PHSSL loans have a *lower* defect rate than non-PHSSL loans. In addition, Plaintiff's experts have failed to establish that Holt Materially Defective loans have a higher probability of serious delinquency than Holt Non-Materially Defective loans at the statistical significance standard set by Plaintiff's expert, Dr. Cowan. Using Dr. McFadden's own models, I find, if anything, a marginally statistically significant relationship between Holt Material Defects and the probability of serious delinquency among all sample loans. For PHSSL loans in particular, I do not find a statistically significant relationship between Holt Material

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Defects and the probability of serious delinquency.   I also find evidence of inconsistencies in defect rates across re-underwriters after controlling for loan and borrower characteristics, further suggesting that Mr. Holt's re-underwriting results are unreliable.   To the extent Mr. Holt's re-underwriting results are unreliable, the conclusions drawn by Plaintiff's other experts based on these findings are similarly unreliable.

R Glenn Hubbard

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Robert Glenn Hubbard

Appendix A

ROBERT GLENN HUBBARD

Curriculum Vitae

PERSONAL DATA

Born: In Orlando, Florida.
Marital Status: Married, two children.

FIELDS OF SPECIALIZATION

Public Economics, Corporate Finance and Financial Institutions, Macroeconomics, Industrial Organization, Natural Resource Economics, Public Policy.

EDUCATION

Ph.D., Economics, Harvard University, May 1983.
Dissertation: *Three Essays on Government Debt and Asset Markets*, supervised by Benjamin M. Friedman, Jerry A. Hausman, and Martin S. Feldstein.

A.M., Economics, Harvard University, May 1981.

B.A., B.S., Economics, University of Central Florida, June 1979, *summa cum laude*.

HONORS AND AWARDS

Homer Jones Lecture, Federal Reserve Bank of St. Louis, 2013.

Fiftieth Anniversary Award of Scholarship, University of Central Florida, 2013.

Franklin Delano Roosevelt Distinguished Service Award, Greater New York Council, Boy Scouts of America, 2012.

Bloomberg Markets, 50 Most Influential Members of the Global Financial Community, 2012.

National Association of Corporate Directors, Directorship 100: People to Watch, 2011.

Joint American Economic Association/American Finance Association Distinguished Speaker, 2008.

Cairncross Lecture, University of Oxford, 2007.

Fellow of the National Association of Business Economists, 2005.

William F. Butler Memorial Award, New York Association of Business Economists Award, 2005.

Exceptional Service Award, The White House, 2002**.**

Michelle Akers Award for Distinguished Service, University of Central Florida, 2001.

Alumni Hall of Fame, University of Central Florida, 2000.

Best Paper Award for Corporate Finance, Western Finance Association, 1998.

Exceptional Service Award, U.S. Department of the Treasury, 1992.

Distinguished Alumnus Award, University of Central Florida, 1991.

John M. Olin Fellowship, National Bureau of Economic Research, 1987-1988.

Teaching Commendations, Graduate School of Business, Columbia University.

Northwestern University Associated Student Government Teaching Awards, announced in 1985, 1986, and 1987.

Graduate Distinctions: National Science Foundation Fellowship, Alfred P. Sloan Foundation Fellowship.

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Undergraduate Distinctions: National Merit Scholarship, National Society of Professional Engineers Award, Florida Society of Professional Engineers Award, National Council of Teachers of English Award, Omicron Delta Kappa, Financial Management Association Honor Society.

POSITIONS HELD

2004-present	Dean, Graduate School of Business, Columbia University
1994-present	Russell L. Carson Professor of Economics and Finance, Graduate School of Business, Columbia University
1997-present	Professor of Economics, Faculty of Arts and Sciences, Columbia University
2007-present	Panel of Economic Advisors, Federal Reserve Bank of New York (also 1993-2001)
2003-present	Featured commentator, *Nightly Business Report*
2003-2010	Featured commentator, *Marketplace*
2003-2007	Visiting Scholar American Enterprise Institute (also 1995-2001)
1999-2004	Co-Director, Columbia Business School Entrepreneurship Program
2004-2005	Viewpoint Columnist, *Business Week*
2004-2006	Member, Panel of Economic Advisors, Congressional Budget Office
2001-2003	Chairman, President's Council of Economic Advisers
2001-2003	Chairman, Economic Policy Committee, Organization for Economic Cooperation and Development
2001-2003	Member, White House National Economic Council and National Security Council
2001-2003	Member, President's Council on Science and Technology
1997-1998	Visiting Professor of Business Administration, Harvard Business School
1995-2001	Visiting Scholar and Director of Tax Policy Program, American Enterprise Institute
1994-1997	Senior Vice Dean, Graduate School of Business, Columbia University
1994	MCI Fellow, American Council for Capital Formation
1994	John M. Olin Visiting Professor, Center for the Study of Economy and the State, University of Chicago
1991-1993	Deputy Assistant Secretary (Tax Analysis), U.S. Department of the Treasury
1988-present	Professor of Economics and Finance, Graduate School of Business, Columbia University
1987-1988	John M. Olin Fellow in residence at the National Bureau of Economic Research
1983-1988	Assistant Professor of Economics, Northwestern University, with half-time research appointment in the Center for Urban Affairs and Policy Research
1985	Visiting Scholar, Center for Business and Government, John F. Kennedy School of Government, Harvard University

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1981-1983	Teaching Fellow (Department of Economics) and Resident Tutor in Economics (Dunster House), Harvard University

DIRECTORSHIPS

2007-present	Met Life
2006-2008	Capmark Financial Corporation; Information Services Group
2004-present	ADP, Inc.; KKR Financial Corporation; BlackRock Closed-End Funds
2004-2008	Duke Realty Corporation
2004-2006	Dex Media/R.H. Donnelley
2003-2005	ITU Ventures
2000-2001	Angel Society, LLC; Information Technology University, LLC

CONSULTING OR ADVISORY RELATIONSHIPS

2005-2009	Arcapita
2005-2010	Nomura Holdings America
2008	Laurus Funds
2005-2008	Chart Venture Partners
2003-2009	Ripplewood Holdings

POSTS IN NON-PROFIT ORGANIZATIONS

2012-present	Trustee, Fifth Avenue Presbyterian Church, New York
2006-present	Co-Chair, Committee on Capital Markets Regulation
2004-present	Member, Advisory Board, National Center on Addiction and Substance Abuse
2003-present	Member, Manhattan District Council Board, Boy Scouts of America
2010-2011	Co-Chair, The Study Group on Corporate Boards
2008-2011	Elder, Fifth Avenue Presbyterian Church
2008-2010	Chairman, Economic Club of New York
2006-2008	Member, Board of Directors, Resources for the Future
2003-2008	Trustee, Tax Foundation
2004-2010	Trustee, Economic Club of New York
2004-2007	Trustee, Fifth Avenue Presbyterian Church, New York

PROFESSIONAL ACTIVITIES

1987-present	Research Associate, National Bureau of Economic Research (Monetary Economics, Corporate Finance, Public Economics, Economic Fluctuations, Industrial Organization)
2007-present	Life Member, Council on Foreign Relations
2003	Member, Committee of Visitors, National Science Foundation
2000	Panelist, Graduate Fellowship Selection Committee, National Science Foundation
1999-2001	Director, Project on Nonprofit Organizations, National Bureau of Economic Research
1997-2001	Member, COSSA-Liaison Committee, American Economic Association
1993-2001	Board of Advisors, Institutional Investor Project, School of Law, Columbia University
1995-1999	Member, Board of Academic Consultants, American Law Institute
1997	Member, Grants Panel for Integrative Graduate Education and Research Training Program, National Science Foundation
1994-1996	Member, Economics Grants Panel, National Science Foundation
1993-1996	Member, Federal Taxation and Finance Committee, National Tax Association
1990-1995	Co-organized research program on International Aspects of Taxation at the National Bureau of Economic Research, Cambridge, Massachusetts
1995	Member, Program Committee, American Economic Association Meeting
1983-1987	Faculty Research Fellow, National Bureau of Economic Research
1983-1986	Adjunct Faculty Research Fellow, Energy and Environmental Policy Center, John F. Kennedy School of Government, Harvard University, Cambridge, Massachusetts
1986, 1988, 1994	Member of the Brookings Panel on Economic Activity
1985, 1987	Special guest of the Brookings Panel on Economic Activity
1990-1991	Organized research program on Environmental Economics and Public Policy at the National Bureau of Economic Research, Cambridge, Massachusetts
1988-1990	Co-organized research program on Dynamic Models of Firms and Industries at the National Bureau of Economic Research, Cambridge, Massachusetts
1985-1989	Organized research program and workshops on contracting in financial markets at the Summer Institute, National Bureau of Economic Research, Cambridge, Massachusetts
1988	Organized Economic Fluctuations program on Industrial Economics and Macroeconomics, National Bureau of Economic Research, Stanford, California
1986-1988	Organized research program and workshop on links between macroeconomics and industrial organization at the Summer Institute, National Bureau of Economic Research, Cambridge, Massachusetts
1991	Member, Program Committee, Econometric Society Winter Meetings

1982-1983	Member, Energy Modeling Forum VII Study Group, Stanford University, Stanford, California
1981-present	Consultant on research projects with private corporations and government and international agencies, including the Internal Revenue Service, Social Security Administration, U.S. Department of Energy, U.S. Department of State, U.S. Department of Treasury, and U.S. International Trade Commission; National Science Foundation; The World Bank; Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York; Congressional Budget Office
Member:	American Economic Association, American Finance Association, Association for Public Policy and Management, Econometric Society, International Association of Energy Economists, National Tax Association, the Royal Economic Society, and the Institute for Management Science
Referee:	*American Economic Review; Canadian Journal of Economics; Columbia Journal of World Business; Econometrica; Economic Journal; Energy Economics; Energy Journal; International Finance; International Tax and Public Finance; Journal of Business; Journal of Business and Economic Statistics; Journal of Economic History; Journal of Economic Literature; Journal of Finance; Journal of Financial Economics; Journal of Financial Intermediation; Journal of Financial and Quantitative Analysis, Journal of Financial Services Research; Journal of Industrial Economics; Journal of International Money and Finance; Journal of Law and Economics; Journal of Macroeconomics; Journal of Money, Credit, and Banking; Journal of Monetary Economics; Journal of Political Economy; Journal of Public Economics; Journal of Regulatory Economics; Journal of Small Business Finance; Management Science; National Tax Journal; Quarterly Journal of Economics; Quarterly Review of Economics and Finance; RAND Journal of Economics; Review of Economic Dynamics; Review of Economic Studies; Review of Economics and Statistics; Review of Financial Economics; Scandinavian Journal of Economics; Southern Economic Journal; National Science Foundation*; C.V. Starr Center for Applied Economics (New York University); Addison-Wesley Publishing Company; Ballinger Press; Cambridge University Press; Harvard Business School Press; MIT Press; W.W. Norton; Oxford University Press
Associate Editor:	*Journal of Applied Corporate Finance*
Former Associate Editor:	*Federal Reserve Bank of New York Economic Policy Review; International Finance; International Tax and Public Finance; Journal of Industrial Economics; Journal of Macroeconomics; Journal of Small Business Finance; National Tax Journal*

PUBLICATIONS AND PAPERS

Edited Volumes

Transition Costs of Fundamental Tax Reform (with K.A. Hassett), Washington, DC: AEI Press, 2001.

Inequality and Tax Policy (with K.A. Hassett), Washington, DC: AEI Press, 2001.

Effects of Taxation on Multinational Corporations (with M. Feldstein and J.R. Hines), Chicago: University of Chicago Press, 1995.

Taxing Multinational Corporations (with M. Feldstein and J. R. Hines), Chicago: University of Chicago Press, 1995.

Studies in International Taxation (with A. Giovannini and J. B. Slemrod), Chicago: University of Chicago Press, 1993.

Financial Markets and Financial Crises, Chicago: University of Chicago Press, 1991.

Asymmetric Information, Corporate Finance, and Investment, Chicago: University of Chicago Press, 1990.

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Books

Balance (with T. Kane), Simon and Schuster, 2013.

Healthy, Wealthy, and Wise (with J.F. Cogan and D.P. Kessler), Hoover Institution Press and AEI Press, 1st ed., 2005; 2nd ed., 2011.

Seeds of Destruction (with P. Navarro), FT Publishing, 2010.

The Mutual Fund Industry: Competition and Investor Welfare (with M.F. Koehn, S.I. Ornstein, M. Van Audenrode, and J. Royer), New York: Columbia Business School Publishing, 2010.

The Aid Trap: Hard Truths About Ending Poverty (with W. Duggan), Columbia Business School Publishing, 2009.

Textbooks

Principles of Economics (with A.P. O'Brien), Pearson Prentice Hall, 1st ed., 2006; 2nd ed., 2008; 3rd ed., 2010; 4th ed., 2013.

Money, Banking, and the Financial System (with A.P. O'Brien), Pearson Prentice Hall, 1st ed., 2012, 2nd ed., 2013.

Macroeconomics (with A.P. O'Brien and M. Rafferty), Pearson Prentice Hall, 1st ed., 2012

Money, the Financial System, and the Economy, Reading: Addison-Wesley Publishing Company, 1st ed., 1994; 2nd ed., 1997; 3rd ed., 2000; 4th ed., 2002; 5th ed., 2004; 6th ed., 2007.

Publications

Articles

"Reforming the Tax Preference for Employer Health Insurance" (with J. Bankman, J.F. Cogan, and D.P. Kessler), *Tax Policy and the Economy*, volume 26, Cambridge, University of Chicago Press, 2012.

"The Effect of Tax Preferences on Health Spending" (with J.F. Cogan and D.P. Kessler), *National Tax Journal*, 64 (2011): 795-816.

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"The Effect of Massachusetts' Health Reform on Employer-Sponsored Insurance Premiums" (with J.F. Cogan and D.P. Kessler), *Forum for Health Economics and Policy*, 2010.

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"To Bundle or Not to Bundle: Firms' Choices Under Pure Building" (with A. Saha and J. Lee), *International Journal of the Economics of Business*, 14 (2007): 59-83.

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"Business, Knowledge, and Global Growth", *Capitalism and Society*, 1 (2006).

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"Benefits of Control, Managerial Ownership, and the Stock Returns of Acquiring Firms" (with D. Palia), *RAND Journal of Economics* 26 (Winter 1995): 782-792.

"Executive Pay and Performance: Evidence from the U.S. Banking Industry" (with D. Palia), *Journal of Financial Economics* 39 (1995): 105-130.

"Tax Policy, Internal Finance, and Investment: Evidence from the Undistributed Profits Tax of 1936-1937" (with C. Calomiris), *Journal of Business* 68 (October 1995): 443-482.

"A Reconsideration of Investment Behavior Using Tax Reforms as Natural Experiments" (with J.G. Cummins and K.A. Hassett), *Brookings Papers on Economic Activity* (1994:2): 1-59.

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"Country Characteristics and the Incidence of Capital Income Taxation on Wages: An Empirical Assessment" (with C. Azémar), Working Paper, Columbia University, 2013.

"Analysis of Discrimination in Prime and Subprime Mortgage Markets" (with Darius Palia and Wei Yu), Working Paper, Columbia University, 2011.

"The Elasticity of Deferred Income With Respect to Marginal Income Tax Rates" (with K.A. Hassett and A. Mathur), Working Paper, Columbia University, 2011.

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"Industrial Behavior and the Business Cycle: A Panel Data Study of U.S. Manufacturing," National Science Foundation (Economics Group SES-8420152), 1985-1987, with Ian Domowitz and Bruce Petersen.

"Efficient Contracting and Market Power: Evidence from the U.S. Natural Gas Market," Transportation Center, Northwestern University, Summer 1985.

"Constructing a Panel Data Base for Studies of U.S. Manufacturing," University Research Grants Committee, Northwestern University, 1985-1986.

"Economic Analysis of Multiple-Price Systems: Theory and Application, "National Science Foundation (Regulatory Analysis and Policy Group, SES-8408805), 1984-1985.

"Contracting and Price Adjustment in Product Markets," University Research Grants Committee, Northwestern University, 1983-1984.

PAPERS PRESENTED

University Seminars

Bard College, University of Bergamo, University of California (Berkeley), University of California (Los Angeles), University of California (San Diego), Carleton, University of Chicago, Columbia, University of Dubuque, Emory, University of Florida, University of Central Florida, Florida Atlantic University, George Washington, Georgetown, Harvard, Hendrix College, University of Illinois, Indiana University, Johns Hopkins, Laval, Lehigh, University College (London), University of Kentucky, London School of Economics, MIT, University of Maryland, University of Miami, Miami University, University of Michigan, University of Minnesota, New York University, Northwestern, Oxford, University of Pennsylvania, Princeton, Rice, University of Rochester, Stanford, Syracuse, University of Miami, University of Texas, Texas Tech University, Tufts, University of Virginia, University of Wisconsin (Madison), University of Wisconsin (Milwaukee), Virginia Tech, and Yale.

Conference Papers Presented

American Council for Capital Formation, Washington, DC, June 1994.

American Economic Association, San Diego, 2013; Chicago, 2012; New Orleans, 2008; Chicago, 2007; Boston, 2006; Philadelphia, 2005; San Diego, January 2004; Atlanta, January 2002; New Orleans, January 2001; Boston, January 2000; New York, January 1999; New Orleans, January 1997; San Francisco, January 1996; Washington, D.C., January 1995; Boston, January 1994; Anaheim, January 1993; Washington, D.C., December 1990; Atlanta, December 1989; New York, December 1988; Chicago, December 1987; New Orleans, December 1985; Dallas, December 1984.

American Enterprise Institute, Conference on Private Equity, 2007; Conference on Corporate Taxation, 2006; Conference on Multinational Corporations, 2004, 2003; Conference on Multinational Corporations, February 1999; Conference on Income Inequality, January 1999; Conference on Transition Costs of Fundamental Tax Reform, November 1998; Conference Series on Social Insurance Reform, 1997-1998; Conference Series on Fundamental Tax Reform, 1995-1998; Conference on Distributional Analysis of Tax Policies, Washington, D.C., December 1993.

American Finance Association, New Orleans, January 2008; San Diego, January 2004; Boston, January 2000; New York, January 1999; New Orleans, January 1997.

Association of Environmental and Resource Economists, Dallas, December 1984; San Francisco, December 1983.

Association of Public Policy Analysis and Management, New Orleans, October 1984; Philadelphia, October 1983.

Bipartisan Commission on Entitlement and Tax Reform, Washington, DC, June 1994.

Brookings Panel on Economic Activity, September 1994, April 1988, September 1987, September 1986, April 1986, September 1985.

Centre for Economic Policy Research Conference on Capital Taxation and European Integration, London, September 1989.

Conference on International Perspectives on the Macroeconomic and Microeconomic Implications of Financing Constraints, Centre for Economic Policy Research, Bergamo, Italy, October 1994.

Congressional Research Service Conference for New Members of Congress, Williamsburg, January 1999.

Congressional Research Service Conference for Members of the Ways and Means Committee, Baltimore, October 2001.

Deutsche Bundesbank Conference on Investing for the Future, Frankfurt, Germany, May 2000.

Eastern Economic Association, Boston, March 1988; Boston, February 1983.

Econometric Society, New Orleans, January 1997; San Francisco, January 1996; Washington, D.C., January 1995; New Orleans, January 1992; Washington, December 1990; Atlanta, December 1989; New York, December 1988; Chicago, December 1987; New Orleans, December 1986; New York, December 1985; Boston, August 1985; Madrid, September 1984; San Francisco, December 1983; Pisa, August 1983.

Energy Modeling Forum, Stanford University, August 1983; February 1983; August 1982.

European Commission, Conference on Taxation of Financial Instruments, Milan, June 1998.

European Institute for Japanese Studies, Tokyo, September 2002; March 2002.

Federal Reserve Bank of Boston, Annual Economic Conference, North Falmouth, Massachusetts, June 1995.

Federal Reserve Bank of Kansas City Symposium on "Financial Market Volatility – Causes, Consequences, and Policy Responses," Jackson Hole, Wyoming, August 1988; Comment of Rogoff, August 2004.

Federal Reserve Bank of New York, Conference on Consolidation of the Financial Services Industry, New York, March 1998.

Federal Reserve Bank of Philadelphia Conference on Economic Policy, Philadelphia, November 2007; November 2001.

Federal Reserve Bank of St. Louis, Conference on Economic Policy, St. Louis, October 1994.

Harvard Law School U. S.-Japan Symposium, Tokyo, December 2003; Washington, D. C., September 2002; Tokyo, December 2001.

Hoover Institution, Conference on Fundamental Tax Reform, December 1995.

The Institute of Gas Technology, Washington, DC, May 1982.

The Institute of Management Science/Operations Research Society of America, Orlando, November 1983; Chicago, April 1983.

International Association of Energy Economists, Boston, November 1986; Philadelphia, December 1985; Bonn, June 1985; San Francisco, November 1984; Washington, DC, June 1983; Denver, November 1982; Cambridge (England), June 1982; Houston, November 1981.

International Conference on the Life Cycle Model, Paris, June 1986.

International Institute of Public Finance, Innsbruck, August 1984.

International Seminar on Public Economics, Amsterdam, April 1997.

National Academy of Sciences, February 1997.

National Association of Business Economists, Orlando, September 2003; Washington, September 2002; New York, September 2001; Boston, September 1996; Dallas, September 1992; New Orleans, October 1987.

National Bureau of Economic Research - IMEMO Conference on the American Economy, Moscow, August 1989.

National Bureau of Economic Research Summer Institute, August 2006; August 2005; July-August 2003; July-August 2000; July-August 1999; July-August 1998; August 1997; July 1995; July 1994; July 1993; August 1992; July-August 1991; July-August 1990; July-August 1989; July-August 1988; July-August 1987; July-August 1986; July 1985; July 1984; July 1983.

National Bureau of Economic Research Conference on Asymmetric Information, Corporate Finance, and Investment, Cambridge, May 1989.

National Bureau of Economic Research Conference on Chinese Economic Reform, Shanghai, China, July 2000.

National Bureau of Economic Research Conference on Financial Crises, Key Biscayne, March 1990.

National Bureau of Economic Research Conference on Government Expenditure Programs, Cambridge, November 1986.

National Bureau of Economic Research Conference on Indian Economic Reform, Rajasthan, India, December 1999.

National Bureau of Economic Research Conference on Innovation Policy, Washington, DC, April 2004, April 2003.

National Bureau of Economic Research Conference on International Taxation, Washington, DC, April 1994; Cambridge, January 1994; New York, September 1991; Nassau, Bahamas, February 1989.

National Bureau of Economic Research, Macroeconomic Annual Conference, Cambridge, MA, April 2004.

National Bureau of Economic Research Conference on Macroeconomics and Industrial Organization, Cambridge, July 1988; Cambridge, July 1987; Cambridge, July 1986; Chicago, November 1985.

National Bureau of Economic Research Conference on Nonprofit Organizations, Cheeca Lodge, January 2002; Cambridge, October 2001.

National Bureau of Economic Research Conference on Pensions, Baltimore, March 1985; San Diego, April 1984.

National Bureau of Economic Research Conference on Productivity, March 1988; March 1987.

National Bureau of Economic Research Conference on Public Economics, Cambridge, April 1999, April 1994, April 1993, November 1991, April 1991, March 1988, November 1987, March 1987.

National Bureau of Economic Research Conference on Tax Policy and the Economy, Washington, DC, October 2001, November 1998, November 1996, November 1994, November 1991, November 1989.

National Bureau of Economic Research Trans-Atlantic Public Economics Seminar, London, May 2002; Gerzensee, May 2000; Turin, May 1994.

Organization for Economic Cooperation and Development, Economic Policy Committee Meeting, Paris, November 2002, April 2002, November 2001, April 2001.

National Tax Association/Tax Institute of America, Washington, DC, June 2000; Atlanta, October 1999; Arlington, May 1992; Seattle, October 1983.

Organization for Economic Cooperation and Development, Ministerial Meeting, Paris, May 2002, May 2001.

Princeton Center for Economic Policy Conference, October 2000, October 1995.

Sveriges Riksbank/Stockholm School of Economics Conference on Asset Markets and Monetary Policy, Stockholm, Sweden, June 2000.

U.S. House of Representatives, Budget Committee, June 2001.

U.S. House of Representatives, Committee on Ways and Means, Washington, DC, June 2006; June 2005; June 1999; April 1997, June 1996, July 1992.

U.S. Joint Economic Committee, Washington, DC, February 2003, October 2002, October 2001, May 2001.

U. S. Senate Committee on Banking, Housing, and Urban Affairs, Washington, DC, October 2001, May 2001.

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PRIOR TESTIMONY

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MBIA Insurance Corporation v. Countrywide Home Loans, Inc., Countrywide Securities Corp., Countrywide Financial Corp., Countrywide Home Loans Servicing, LP and Bank of America Corp., 08/602825, Supreme Court of the State of New York, County of New York. Provided deposition testimony in 2012.

City of St. Petersburg, Florida v. Wells Fargo Bank, N.A., 8:10-CV-693-T-26 TBM, United States District Court, Middle District of Florida. Provided deposition testimony in 2011 and trial testimony in 2012.

Pacific Select Fund v. The Bank of New York Mellon, CV 10-00198 JST, United States District Court, Central District of California. Provided deposition testimony in 2011.

Securities and Exchange Commission against Ralph Cioffi and Matthew Tannin, 08 Civ. 2457 (FB), United States District Court, Eastern District of New York. Provided deposition testimony in 2011.

Chemtech Royalty Associates, L.P., by Dow Europe, S.A., as Tax Matters Partner v. United States of America, 06-258-BAJ-DLD, United States District Court, Middle District of Louisiana. Provided deposition testimony in 2009 and trial testimony in 2011.

The Board of Trustees of the Southern California IBEW-NECA Defined Contribution Plan v. The Bank of New York Mellon Corporation, et al., Civil Action No. 09-cv-06273 (RMB)(AJP), United States District Court, Southern District of New York. Provided deposition testimony in 2011.

SCF Arizona v. Wachovia Bank, N.A., 09 Civ. 9513 (WHP), United States District Court, Southern District of New York. Provided deposition testimony in 2011.

Air Products and Chemicals, Inc. v. Airgas, Inc., Peter McCausland, et al., Civil Action No. 5249-CC, Court of Chancery of the State of Delaware. Provided deposition testimony and trial testimony in 2010.

Charles Fisher, et al. v. ABB, Inc., et al., 2:06-CV-04305 (NKL), United States District Court, Western District of Missouri. Provided deposition testimony in 2009 and trial testimony in 2010.

United States of America against Ralph Cioffi and Matthew Tannin, 08-CR-415(FB), United States District Court, Eastern District of New York. Provided trial testimony in 2009.

Novell, Inc. v. Microsoft Corporation, MDL Docket No. 1332, Civil Action No. JRM-05-1087, United States District Court, District of Maryland. Provided deposition testimony in 2009.

In Re American Mutual Funds Fee Litigation, 2:04-cv-05593-GAF-RNB, United States District Court, Central District of California, Western Division. Provided deposition testimony in 2009.

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Appendix B: Defendant's Definition of HSSL Loans (DHSSL)

Per counsel's instructions, I define DHSSL loans as Full Spectrum Lending loans that meet all of the following three criteria:

(1) Application Date within either of two periods: the "Pilot" period and the "Central Fulfillment" period.

    a. The Pilot period is from August 13, 2007 to September 30, 2007, during which DHSSL loans were processed at two branches (ProcBrNum_SM of "6205" or "6221").

    b. The Central Fulfillment period is from October 2007 to April 2008, during which DHSSL loans were processed at the following branches for each of the corresponding months:

ApplDtTm		ProcBrNum_SM											
Oct-07	Richardson	6305	6214	6295	6211	6384	6213	6210	6193	6209	6205		
Oct-07	Chandler	6225	6194	6241	6222	6223	6195	6243	6221				
Oct-07	Rosemead	6333	6332	6334									
Oct-07	Hatboro	none											
Nov-07	Richardson	6253	6305	6384	6295	6210	6193	6039	6214	6211	6213	6209	6205
Nov-07	Chandler	6252	6221	6241	6243	6050	6223	6195	6194				
Nov-07	Rosemead	6261	6332	6334	6330								
Nov-07	Hatboro	6264	6379	6374	6380								
Dec-07	Richardson	6253	6305	6384	6295	6210	6193	6039	6214	6211	6213	6209	6205
Dec-07	Chandler	6252	6221	6241	6243	6050	6223	6195	6194				
Dec-07	Rosemead	6258	6332	6334	6333	6330	6329	6331					
Dec-07	Hatboro	6264	6379	6374	6380								
Jan-08	Richardson	6253	6305	6384	6295	6210	6193	6039	6214	6211	6213	6209	6205
Jan-08	Chandler	6252	6221	6241	6243	6050	6223	6195	6194				
Jan-08	Rosemead	6258	6332	6334	6333	6330	6329	6331					
Jan-08	Hatboro	6264	6379	6374	6380								
Feb-08	Richardson	6253	6305	6384	6295	6210	6193	6039	6214	6211	6213	6209	6205
Feb-08	Chandler	6252	6241	6050	6195	6194	6245						
Feb-08	Rosemead	6258	6332	6334	6333	6330	6329	6331					
Feb-08	Hatboro	6264	6379	6374	6380								
Mar-08	Richardson	6253	6305	6295	6210	6039	6214	6213	6209	6205			
Mar-08	Chandler	6050	6195	6194	6245	6241							
Mar-08	Rosemead	6258	6332	6334	6333	6330	6329	6331					
Mar-08	Hatboro	6264	6379	6374	6380								
Apr-08	Richardson	6253	6305	6295	6210	6193	6039	6214	6213	6209	6205		
Apr-08	Chandler	6050	6195	6194	6245	6241							
Apr-08	Rosemead	6258	6332	6334	6333	6330	6329	6331					
Apr-08	Hatboro	6264	6379	6374	6380								

(2) No Underwriter Involvement [1]

(3) Mortgage Date (MtgDt) on or earlier than April 27, 2008

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[1] "Underwriter involvement" is identified by searching for "Underwrit" in the following variables: SM_PC1_Title, SM_PC2_Title, SM_PC3_Title, CMD_PC_1_JobTitle, CMD_PC_2_JobTitle, CMD_PC_3_JobTitle, SM_PTA_Title, CMD_PTA_Title, SM_PTD_Title, CMD_PTD_Title, SM_UwHist_Title, CMD_UwHist_Title, Tracker_Title, PM_Request_CTC_Approver_Title, PM_Request_Undw_Title, SASE_Title, PM_BranchOpsMngr_Title, PM_LoanProc_Title, PM_TeamMngr_Title, PM_Underwriting_Title, PM_BranchMngr_Title, PM_Subber_Title, PM_UndwTeamMngr_Title, PM_UWApprover_Title, PM_UW2ndSignor_Title, PM_UWCTC_Title, PM_TempLSAssignment_Title, PM_UndwCondReview_Title, PM_UndwStatedIncReview_Title, PM_UWATM_Title, and PM_SLDUW_Title.

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Appendix C
Materials Relied Upon

Court Documents

Amended Complaint of the United States of America, *United States of America v. Countrywide Financial Corporation et al.* , United States District Court, Southern District of New York, January 11, 2013 .

Corrected Expert Report of Daniel L. McFadden, Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corp. *et al.* , 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, June 6, 2013 (including backup files).

Correction to the May 7, 2013 Expert Report of Daniel L. McFadden, Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corp. *et al.* , 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, June 6, 2013.

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Deposition of Marianne Sullivan, June 10, 2013.

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Expert Report of Charles D. Cowan, Ph.D., Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corp. *et al.* , 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, May 7, 2013 (including backup files).

Expert Report of Daniel L. McFadden, Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corp. *et al.* , 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, May 7, 2013 (including backup files).

Expert Report of Dr. Joseph R. Mason, Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corporation *et al.,* 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, May 7, 2013 (including backup files).

Expert Report of Ira H. Holt, Jr., Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corp. *et al.,* 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, May 7, 2013

Updated and Corrected Expert Report of Dr. Joseph R. Mason, Concerning United States of America *ex rel.* Edward O'Donnell v. Countrywide Financial Corporation *et al.,* 12 Civ. 1422 (JSR), ECF Case, United States District Court, Southern District of New York, May 31, 2013 (including backup files).

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Nothaft, Frank, Amy Crews Cutts, Calvin Schnure, and Nela Richardson, "December 2006 Economic Outlook: Anatomy of a Housing Recovery," Office of the Chief Economist at Freddie Mac, December 8, 2006.

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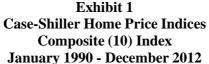
FSLDataForGovt_UWandLP_20130318 - Priv.xlsx.

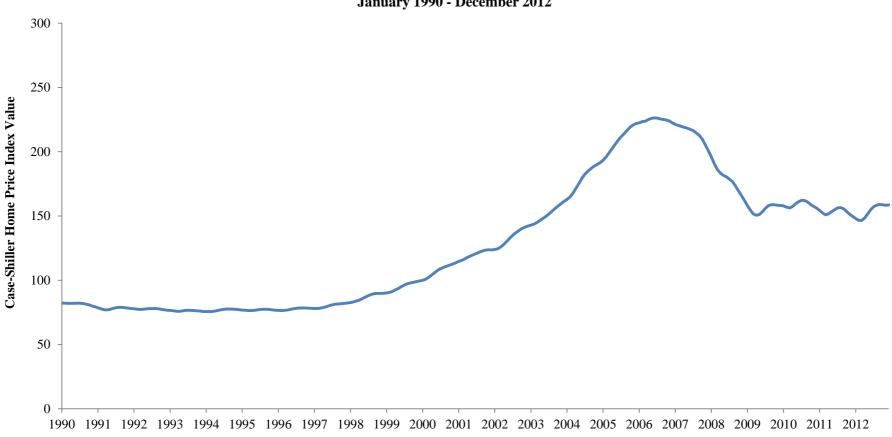Mortgage Bankers Association National Delinquency Survey, available at <http://www.mbaa.org/ResearchandForecasts/ProductsandSurveys/NationalDelinquencySurvey.htm>.

S&P Dow Jones Indices, S&P/Case-Shiller Home Price Indices, available at <http://us.spindices.com/index-family/real-estate/sp-case-shiller>, downloaded on April 30, 2013.

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Exhibit 1
Case-Shiller Home Price Indices
Composite (10) Index
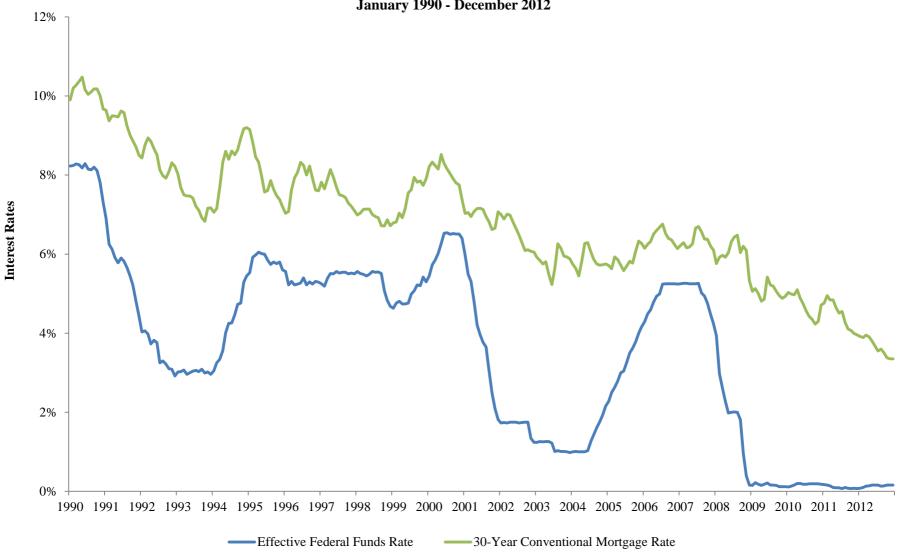**January 1990 - December 2012**

Notes:

[1] The Case-Shiller Home Price Index Composite (10) tracks monthly changes in the value of the residential real estate market in 10 metropolitan regions (Boston, Chicago, Denver, Las Vegas, Los Angeles, Miami, New York, San Diego, San Francisco, and Washington, D.C.). The Case-Shiller indices use a value-weighted repeat sales pricing technique to measure changes in these housing markets.

[2] Values are non-seasonally adjusted.

Sources:

[1] S&P Dow Jones Indices, S&P/Case-Shiller Home Price Indices, available at <http://us.spindices.com/index-family/real-estate/sp-case-shiller>, downloaded on April 30, 2013.

[2] S&P Dow Jones Indices, S&P/Case-Shiller Home Price Indices Methodology, April 2013, available at <http://us.spindices.com/index-family/real-estate/sp-case-shiller>, downloaded on April 30, 2013.
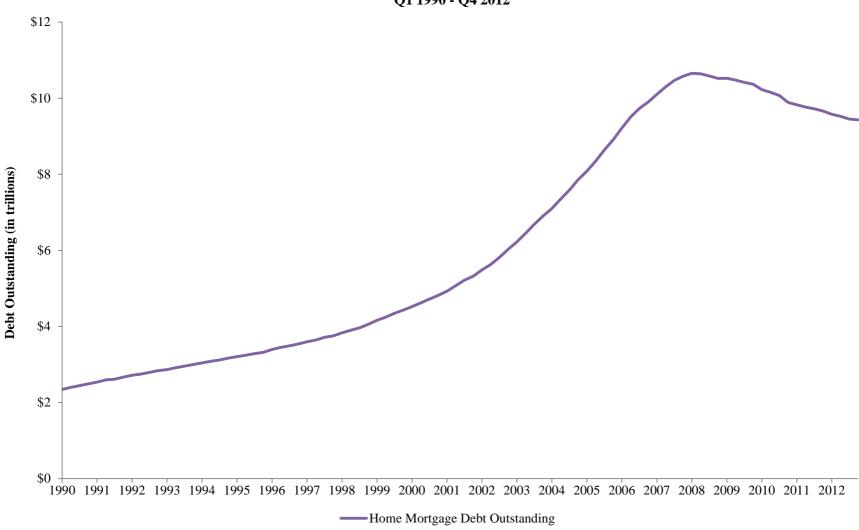
Exhibit 2
Effective Federal Funds Rate and 30-Year Conventional Mortgage Rate
United States
January 1990 - December 2012

Source:
Federal Reserve, H.15 Selected Interest Rates, available at <https://www.federalreserve.gov/datadownload/Choose.aspx?rel=H.15>, downloaded on April 30, 2013.

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Exhibit 3
Home Mortgage Debt Outstanding
United States
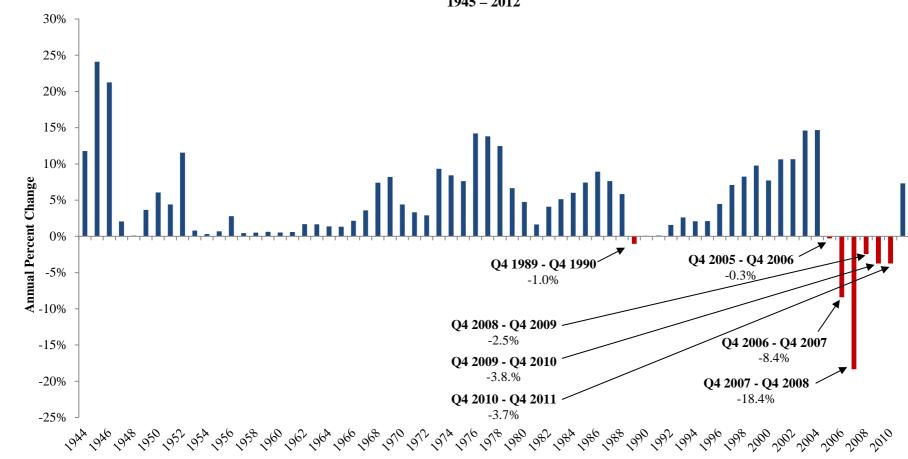**Q1 1990 - Q4 2012**

Home Mortgage Debt Outstanding

Note:
Data represent the seasonally adjusted amount outstanding at the end of each period.
Source:
Federal Reserve, Flow of Funds Accounts of the United States, available at <http://www.federalreserve.gov/datadownload/Choose.aspx?rel=Z.1>, downloaded on April 30, 2013.

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Exhibit 4
Home Price Index
Annual Percent Changes in House Prices for the United States
1945 – 2012

Q4 1989 - Q4 1990
-1.0%

Q4 2005 - Q4 2006
-0.3%

Q4 2008 - Q4 2009
-2.5%

Q4 2009 - Q4 2010
-3.8.%

Q4 2010 - Q4 2011
-3.7%

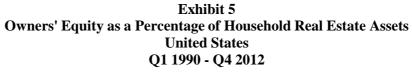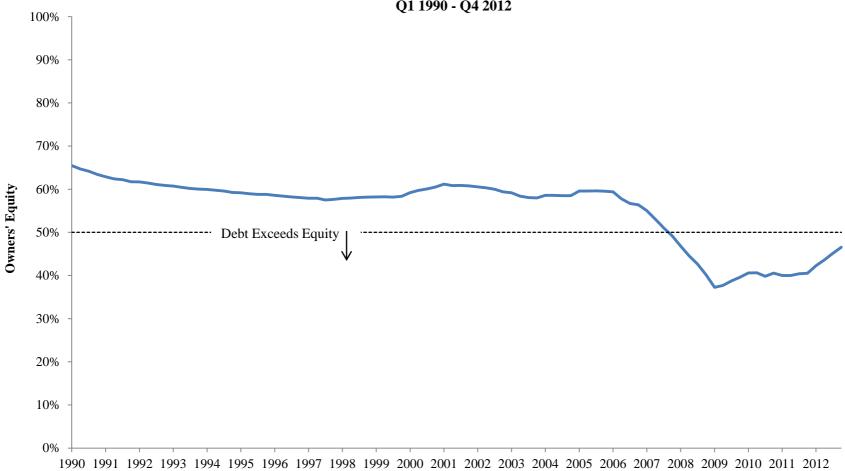**Q4 2006 - Q4 2007**
-8.4%

Q4 2007 - Q4 2008
-18.4%

Note:

The home price index shown above was constructed by linking four independent price series:

[1] 1945-52: Simple average of median home prices in five cities. Constructed by Robert J. Shiller using prices advertised in newspapers - annual data.

[2] 1953-74: Index constructed from Bureau of Labor Statistics home sales data - quarterly data, fourth quarter values are used.

[3] 1975-86: U.S. Office of Housing Enterprise Oversight's (OFHEO) U.S. Home Price Index - quarterly data, fourth quarter values are used.

[4] 1987-12: Standard & Poor's, S&P/Case-Shiller National Home Price Index, not seasonally adjusted - quarterly data, fourth quarter values are used.

Source:

Shiller, Robert J., *Irrational Exuberance*, Second Edition, Princeton, N.J.:Princeton University Press, 2005, pp. 234-235, data available at

<http://www.irrationalexuberance.com/index.htm>, downloaded on April 30, 2013.

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Exhibit 5
Owners' Equity as a Percentage of Household Real Estate Assets
United States
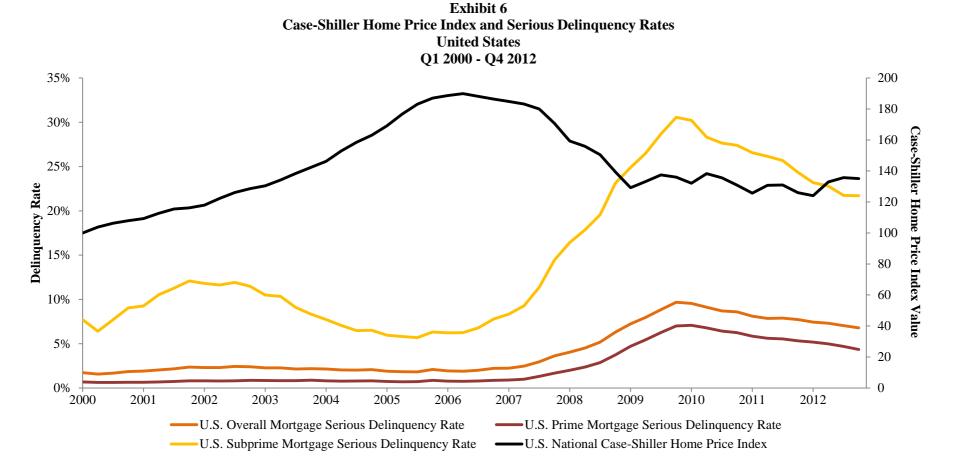**Q1 1990 - Q4 2012**

Notes:

[1] Owners' equity as a percentage of household real estate assets calculated by dividing household owners' equity in real estate by household's owner-occupied real estate assets.

[2] When the percentage falls below 50 percent, aggregate household debt exceeds aggregate household equity.

[3] This graph does not account for the distribution of equity across households. As of December 2012, 21.5 percent of all residential properties with a mortgage had negative equity.

[CoreLogic Negative Equity Report, Q4 2012, available at <http://www.corelogic.com>]

Sources:

[1] Federal Reserve, Flow of Funds Accounts of the United States, <http://www.federalreserve.gov/datadownload/Choose.aspx?rel=Z.1>, downloaded on May 1, 2013.

[2] CoreLogic Negative Equity Report, Q4 2012, available at <http://www.corelogic.com>

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Exhibit 6
Case-Shiller Home Price Index and Serious Delinquency Rates
United States
Q1 2000 - Q4 2012

Notes:
[1] U.S. mortgage serious delinquency is defined as mortgage payments past due 90 or more days plus mortgage foreclosure inventory. The rates "are calculated based on the number of loans serviced and not the dollar value." (Mortgage Bankers Association, National Delinquency Survey Facts)
[2] The National Delinquency Survey is "a voluntary survey of over 120 mortgage lenders, including mortgage banks, commercial banks, thrifts, savings and loan associations, subservicers, and life insurance companies." The National Delinquency Survey covers between 85 and 88 percent of loans outstanding in the market. (Mortgage Bankers Association, National Delinquency Survey Facts)
[3] The U.S. National Case-Shiller Home Price Index is based on non seasonally adjusted data. Serious delinquency rates are not seasonally adjusted.
Sources:
[1] Mortgage Bankers Association National Delinquency Survey, available at <http://www.mbaa.org/ResearchandForecasts/ProductsandSurveys/NationalDelinquencySurvey.htm>.
[2] Mortgage Bankers Association, National Delinquency Survey: Facts.
[3] S&P/Case-Shiller Home Price Indices, available at <http://us.spindices.com/indices/real-estate/sp-case-shiller-us-national-home-price-index>, downloaded on May 29, 2013.
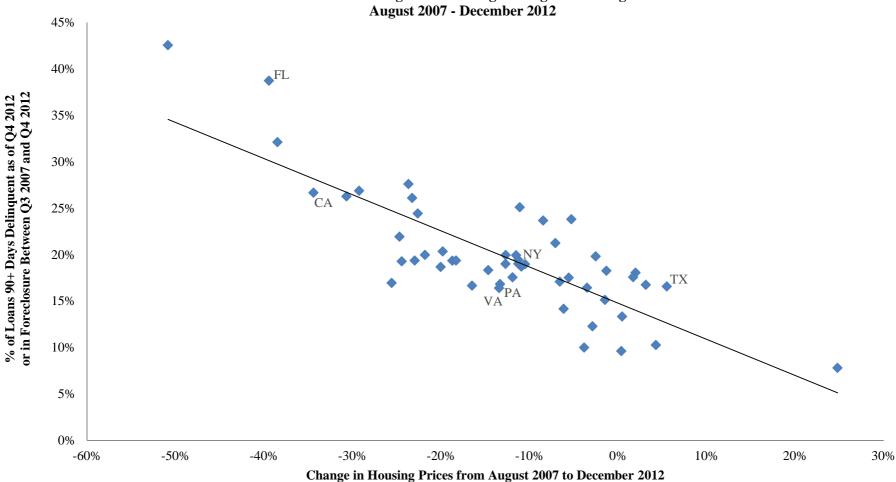[4] S&P Dow Jones Indices: S&P/Case-Shiller Home Price Indices Methodology, May 2013, downloaded on May 29, 2013.

Exhibit 7
Loan Default Percentage vs. Percentage Change in Housing Values
August 2007 - December 2012

Notes:
[1] The top six states by total number of HSSL loans, as defined by Plaintiff, are labeled.
[2] The Mortgage Bankers Association survey does not include charge-off loans, real estate owned, or bankruptcy in its calculation of serious delinquency. In order to account for properties for which foreclosure proceedings have concluded, and which are therefore no longer captured by the MBA survey data, I calculate serious delinquencies as the sum of 90+ day Delinquencies as of Q4 2012 and Foreclosure Starts between Q3 2007 and Q4 2012, divided by the sum of loans serviced in Q4 2012 and the difference between Foreclosure Starts and Foreclosure Inventory (that is, loans that were removed from foreclosure inventory by being liquidated or entering REO status).
Sources:
[1] "FISERV Housing Index," available at <www.fiserv.com>.
[2] Mortgage Bankers Association National Delinquency Survey, available at <http://www.mbaa.org/ResearchandForecasts/ProductsandSurveys/NationalDelinquencySurvey.htm>.

Exhibit 8
Unemployment Rate, Serious Delinquency Rate, and Foreclosure Inventory Rate
United States
Q1 1990 - Q4 2012

Unemployment Rate   Serious Delinquency Rate   Foreclosure Inventory Rate

Notes:
[1] Serious delinquency is defined as mortgage payments past due 90 or more days plus mortgage foreclosure inventory. The rates "are calculated based on the number of loans serviced and not the dollar value." (Mortgage Bankers Association, National Delinquency Survey Facts)
[2] The National Delinquency Survey is "a voluntary survey of over 120 mortgage lenders, including mortgage banks, commercial banks, thrifts, savings and loan associations, subservicers, and life insurance companies." The National Delinquency Survey covers between 85 and 88 percent of loans outstanding in the market. (Mortgage Bankers Association, National Delinquency Survey Facts)
[3] Unemployment rate is seasonally adjusted. Serious delinquency rate and foreclosure inventory rate are not seasonally adjusted.
Sources:
[1] Bureau of Labor Statistics, Labor Force Statistics including the National Unemployment Rate, available at <http://www.bls.gov/data/#unemployment>, accessed on 5/29/2013.
[2] Mortgage Bankers Association National Delinquency Survey, available at <http://www.mbaa.org/ResearchandForecasts/ProductsandSurveys/NationalDelinquencySurvey.htm>.
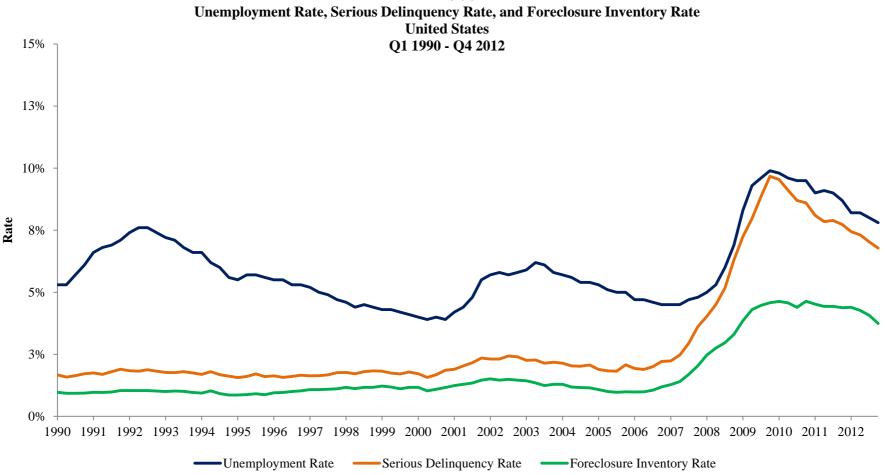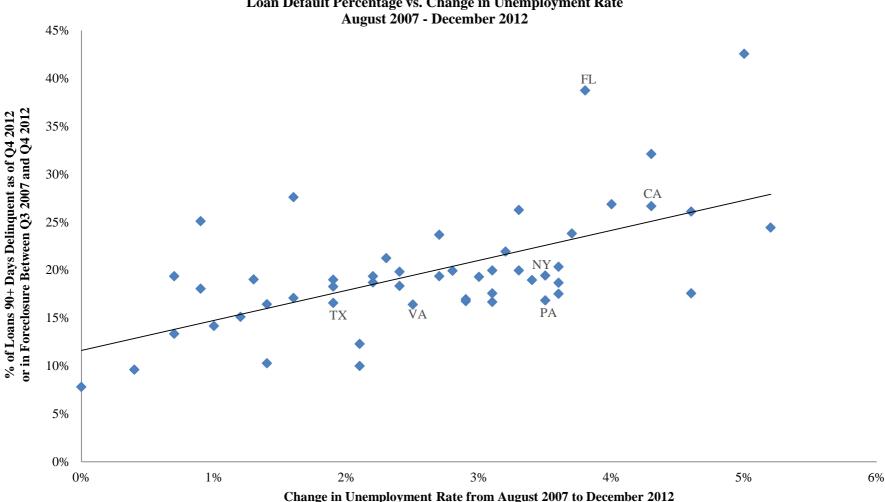[3] Mortgage Bankers Association National Delinquency Survey Facts.

Exhibit 9
Loan Default Percentage vs. Change in Unemployment Rate
August 2007 - December 2012

Notes:
[1] The top six states by total number of HSSL loans, as defined by Plaintiff, are labeled.
[2] The Mortgage Bankers Association survey does not include charge-off loans, real estate owned, or bankruptcy in its calculation of serious delinquency. In order to account for properties for which foreclosure proceedings have concluded, and which are therefore no longer captured by the MBA survey data, I calculate serious delinquencies as the sum of 90+ day Delinquencies as of Q4 2012 and Foreclosure Starts between Q3 2007 and Q4 2012, divided by the sum of loans serviced in Q4 2012 and the difference between Foreclosure Starts and Foreclosure Inventory (that is, loans that were removed from foreclosure inventory by being liquidated or entering REO status).
Sources:
[1] Bureau of Labor Statistics, Unemployment rates by State, seasonally adjusted, for August 2007 and December 2012, available at <http://www.bls.gov/data>.
[2] Mortgage Bankers Association National Delinquency Survey, available at <http://www.mbaa.org/ResearchandForecasts/ProductsandSurveys/NationalDelinquencySurvey.htm>.

Exhibit 10

Factors Impacting Loan Performance

This exhibit describes factors that are included in the panel logit regression model used in this report. The factors include loan and borrower characteristics as well as macroeconomic conditions such as house price and unemployment trends.

Documentation

This variable captures the amount of documentation a borrower is required to provide during the underwriting process and is another indicator of credit quality. A fully documented loan application requires the borrower to provide specific documentation that verifies, among other things, the borrower's income and assets. Particularly from 1999 to 2006, documentation programs that enabled borrowers to qualify for loans without disclosing and verifying income and assets increased in popularity.[1] Academic research has shown that loans with less than full documentation are more likely to default than fully documented loans.[2]

FICO Score

A FICO score is a credit score assigned to a borrower by an independent credit bureau assessing the creditworthiness of the borrower, which lenders use in their determinations of how much, if any, credit to extend.[3] All else equal, a borrower with a higher FICO score is more creditworthy and is therefore less likely to default or become delinquent on loan payments.[4]

House Price Changes and the Loan-to-Value Ratio

The loan-to-value ("LTV") and combined loan-to-value ("CLTV") ratios are relevant predictors of loan performance. These ratios measure the amount borrowed relative to the market value of the collateral property.[5] With a depreciation in the value of the property, a borrower with a high CLTV loan is more quickly "underwater," meaning the value of the loan exceeds the market value of the property. In such a situation, refinancing is difficult and it is nearly impossible to take out a larger mortgage in order to pay off an existing mortgage.[6] Based on this reasoning, a relevant metric for predicting default is current equity, defined as one minus the CLTV ratio, adjusted for house price changes.[7] A borrower has less of

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[1] Guttentag, Jack, *The Mortgage Encyclopedia: An Authoritative Guide to Mortgage Programs, Practices, Prices, and Pitfalls*: McGraw Hill, 2004, pp. 49-50; Krinsman, Allan, "Subprime Mortgage Meltdown: How did it Happen and How will it End?," *Journal of Structured Finance,* Volume 13, Number 2, Summer 2007, pp. 3-4; Gerardi, Kristopher, Andreas Lehnert, Shane M. Sherlund, and Paul Willen, "Making Sense of the Subprime Crisis," *Brookings Papers on Economic Activity*, Fall 2008, pp. 78-84.

[2] Mayer, Christopher, Karen Pence, and Shane Sherlund, "The Rise in Mortgage Defaults," *Journal of Economic Perspectives,* Volume 23, Number 1, Winter 2009, p. 43.

[3] Downes, John, and Jordan Goodman, *Dictionary of Finance and Investment Terms*, Eighth Edition, Barron's Educational Services, Inc., 2010, p. 159.

[4] Agarwal, Sumit, Brent W. Ambrose, Souphala Chomsisengphet, and Chunlin Liu*,* "An Empirical Analysis of Home Equity Loan and Line Performance," *Journal of Financial Intermediation,* Volume 15, 2006, p. 458.

[5] The CLTV ratio includes the outstanding principal balances of all loans extended to the borrower.

[6] Mayer, Christopher, Karen Pence, and Shane Sherlund, "The Rise in Mortgage Defaults," *Journal of Economic Perspectives,* Volume 23, Number 1, Winter 2009, p. 45-46.

[7] For example, if the house-price-adjusted CLTV ratio is 75 percent, equity is equal to 25 percent (one minus 75 percent).

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an incentive to repay a loan when the equity in the home declines below the outstanding loan balance and is therefore more likely to default.[8]

Debt-to-Income Ratio

A higher debt-to-income ratio represents greater financial obligations as a percentage of income, making it more difficult for a borrower to afford the monthly mortgage payment. Academic studies find evidence that loans with higher debt-to-income ratios are more likely to default.[9]

Interest Only

Interest Only mortgages allow borrowers to make interest-only payments for a period of time, usually five to ten years. At the end of this period, the monthly payment is adjusted into a payment large enough to pay off the mortgage balance in full prior to the end of the mortgage term. The adjustment can result in a substantial payment increase as the borrower now has to repay principal, and has to pay off the principal over a shorter period of time than the original mortgage term. Academic studies find evidence that serious delinquency rates have risen steeply on these type of mortgages.[10]

Loan Purpose

Mortgage loans may be used to purchase a home or to refinance existing loans. Academic studies have found that default is less likely for loans used for refinancing purposes.[11] Cash-out refinances, in which borrowers restructure outstanding mortgages and receive a cash payment, are most commonly used to consolidate debt and to improve the property, both beneficial activities that reduce the likelihood of default.[12]

Loan Size

A larger nominal size of the loan represents a greater financial obligation for the borrower.[13]

Property Type

Among the class of residential mortgages, the property collateral may be a single family home or a multi-unit condominium facility. Some academic research has found that default is more likely for single-

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[8] Ambrose, Brent, Charles Capone, and Yongheng Deng, "Optimal Put Exercise: An Empirical Examination of Conditions for Mortgage Foreclosure," *Journal of Real Estate Finance and Economics,* Volume 23, Issue 2, 2001, pp. 213-234; Quigley, John M., and Robert Van Order, "Explicit Tests of Contingent Claims Models of Mortgage Default," *Journal of Real Estate Finance and Economics,* Volume 11, 1995, pp. 99-117.

[9] Demyanyk, Yuliva, and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *The Review of Financial Studies,* Volume 24, Number 6, 2011, pp. 1848-1880.

[10] Mayer, Christopher, Karen Pence, and Shane Sherlund, "The Rise in Mortgage Defaults," *Journal of Economic Perspectives*, Volume 23, Number 1, Winter 2009, p. 40.

[11] Demyanyk, Yuliya, and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *Review of Financial Studies,* Volume 24, Number 6, 2011, pp. 1848-1880.

[12] Pennington-Cross, Anthony, and Souphala Chomsisengphet, "Subprime Refinancing: Equity Extraction and Mortgage Termination," *Real Estate Economics,* Volume 35, 2007, pp. 233-263.

[13] Demyanyk, Yuliya, and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *The Review of Financial Studies,* Volume 24, Number 6, 2011, pp. 1848-1880.

Exhibit 10   2

family properties,[14] while other academic research has found that default is less likely for single-family properties.[15]

Residency

Borrowers who purchased their homes to live in (as opposed to purchasing them for investment purposes) may find it more difficult to walk away from their homes if the mortgage exceeds the value of the property. Academic studies provide evidence that borrowers obtaining a loan for a primary residence are less likely to default than borrowers using the loan for investment properties.[16]

Unemployment

Unemployment is one of many possible "credit trigger events" that can result in loan delinquency or default. As such, academic studies often find that increases in the local unemployment rate are associated with higher expected rates of default, particularly when coupled with declining house prices.[17]

Year of Loan Origination

There are a number of reasons why time of origination may provide information regarding default behavior. For example, industry-wide, disclosed underwriting guidelines changed over time and, therefore, expected performance may vary depending on the year of origination.[18]

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[14] Elul, Ronel, Nicholas Souleles, Souphala Chomsisengphet, Dennis Glennon, and Robert Hunt, "What 'Triggers' Mortgage Default?" Federal Reserve Bank of Philadelphia Working Paper No. 10-13, April 2010.

[15] Gerardi, Kristopher, Adam Hale Shapiro, and Paul S. Willen, "Subprime Outcomes: Risky Mortgages, Homeownership Experiences, and Foreclosures," Federal Reserve Bank of Boston Working Paper No. 07-15, May 4, 2008.

[16] Mayer, Christopher, Karen Pence, and Shane Sherlund, "The Rise in Mortgage Defaults," *Journal of Economic Perspectives,* Volume 23, Number 1, Winter 2009, p. 44.

[17] Demyanyk, Yuliya, and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *The Review of Financial Studies,* Volume 24, Number 6, 2011, pp. 1848-1880; Mayer, Christopher, Karen Pence, and Shane Sherlund, "The Rise in Mortgage Defaults," *Journal of Economic Perspectives,* Volume 23, Number 1, Winter 2009, p. 45; Agarwal, Sumit, Brent W. Ambrose, Souphala Chomsisengphet, and Chunlin Liu, "An Empirical Analysis of Home Equity Loan and Line Performance," *Journal of Financial Intermediation,* Volume 15, 2006, pp. 454, 459.

[18] Demyanyk, Yuliya, and Otto Van Hemert, "Understanding the Subprime Mortgage Crisis," *The Review of Financial Studies,* Volume 24, Number 6, 2011, pp. 1848-1880.

Exhibit 10   3

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Exhibit 11A
Modification of McFadden Table 7 Model (1)
Estimated on Population of Loans and Excluding Defect Variables
Excluding Loans Outside HSSL Origination Months
Plaintiff's Definition of HSSL

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	1.310	***	0.264	0.000
PHSSL	-0.059	***	0.020	0.003
LoanFICOScore	-0.013	***	0.000	< 2e-16
DTI	0.015	***	0.001	< 2e-16
DTI > 50	0.174	***	0.026	0.000
CLTV	0.037	***	0.001	< 2e-16
Loan Amount	0.002	***	0.000	< 2e-16
HPI Growth	-3.640	***	0.135	< 2e-16
Refinance	0.225	***	0.047	0.000
2-4 Units	0.075		0.096	0.431
Condominium	0.038		0.035	0.272
PropType-Other	0.430	*	0.235	0.068
Planned Unit Development	-0.071	**	0.028	0.011
PropType-Unknown	-0.001		0.053	0.990
Alt	-0.078	***	0.022	0.000
Fast And Easy	0.571	***	0.030	< 2e-16
Fastrack	0.436	***	0.043	< 2e-16
Other	1.426	***	0.094	< 2e-16
Reduced	1.017	***	0.047	< 2e-16
Investment	0.240	***	0.041	0.000
Secondary Residence	-0.016		0.055	0.768
OccType-Unknown	-0.155		1.123	0.890

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] Similar to Table 7 in the Corrected Expert Report of Daniel L. McFadden, June 6, 2013, this regression includes controls for fixed effects by State and by Origination Month.

Source:

Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

Exhibit 11B
Modification of McFadden Table 7 Model (1)
Estimated on Population of Loans and Excluding Defect Variables
Excluding Loans Outside HSSL Origination Months
Defendant's Definition of HSSL

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	3.218	***	0.236	0.000
DHSSL	0.046		0.029	0.119
LoanFICOScore	-0.013	***	0.000	0.000
DTI	0.014	***	0.001	0.000
DTI > 50	0.159	***	0.028	0.000
CLTV	0.038	***	0.001	0.000
Loan Amount	0.002	***	0.000	0.000
HPI Growth	-3.582	***	0.147	0.000
Refinance	0.188	***	0.051	0.000
2-4 Units	0.067		0.111	0.546
Condominium	0.023		0.037	0.531
PropType-Other	1.272		0.849	0.134
Planned Unit Development	-0.063	**	0.030	0.039
PropType-Unknown	-0.010		0.055	0.855
Alt	-0.086	***	0.023	0.000
Fast And Easy	0.549	***	0.032	0.000
Fastrack	0.405	***	0.048	0.000
Other	1.392	***	0.094	0.000
Reduced	0.995	***	0.048	0.000
Investment	0.255	***	0.044	0.000
Secondary Residence	0.022		0.060	0.713

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] Similar to Table 7 in the Corrected Expert Report of Daniel L. McFadden, June 6, 2013, this regression includes controls for fixed effects by State and by Origination Month.

Source:

Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

Exhibit 11C
Definition of Explanatory Variables used in McFadden Table 7 Model (1)

Control Variables	Definition
LoanFicoScore	*LoanFicoScore*
DTI	*DTI* ; 50 if *DTI* > 50; original value otherwise
DTI > 50	1 if *DTI* > 50; 0 otherwise
CLTV	*CLTV*
Loan Amount	*LoanAmt*
HPI Growth	HPI Growth is measured as the proportional change in HPI one year after origination. HPI data is provided in the backup materials of Dr. McFadden's report.
Refinance	1 if *FinType* = Refinance; 0 if *FinType* = Purchase; missing if otherwise
2-4 Units Condominium PropType-Other Planned Unit Development PropType-Unknown	*PropType*
Alt Fast And Easy Fastrack Other Reduced	*TradingDocType_Lynx*
Investment Secondary Residence	*OccType*

Note:
Variables in *italics* denote variable names used in "2012-12-27 -- Data to SDNY -- US v Bank of America -- Confidential.csv"
Source:
Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

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Exhibit 12

Loan-Level Model

This exhibit provides an overview of my loan-level model and describes the method I use to identify comparable loans and the data sources and variables I use in my regression analysis.

I)   Loan Level Model

My loan-level model estimates the probabilities of default and prepayment for each loan in each month, conditional on a loan being current in all previous months, using a multinomial panel logit framework. The dependent variable is equal to one of three possible loan statuses: prepay, current, or default/serious delinquency. The independent variables are described in the text of the report and Exhibit 10, and specific details regarding the calculation of such variables are provided in Section III of this exhibit.[1]

I estimate the model on the set of comparable Full Spectrum Lending loans sold to the GSE's and comparable loans GSE purchased from all lenders (selection process is described below) to obtain estimates of the relationship between loan performance and loan and borrower characteristics and changes in macroeconomic conditions. I use the estimated coefficients to calculate the expected default (and prepayment) rates of the HSSL loans, controlling for their individual characteristics. Specifically, I calculate the conditional probability that a HSSL loan will either default or prepay in any given month based on the HSSL loan's characteristics and the coefficient estimates from the regression model estimated using non-HSSL loans. I aggregate the monthly probabilities to calculate the cumulative default probability from the time of loan origination to December 2012. The cumulative default probability for an individual loan equals the sum of the estimated conditional default probabilities multiplied by the probability that the loan will not have prepaid or defaulted in earlier months. The estimated proportion of defaults for the loans is equal to the sum across all loans of the individual cumulative default probabilities divided by the total number of loans. If the HSSL loans have a lower cumulative default rate than expected, I conclude that the HSSL loans performed better than expected based on the performance of the comparable loans, controlling for differences in loan and borrower characteristics and macroeconomic conditions.

I test whether the difference between the actual and expected default rate for the HSSL loans is statistically significant using "bootstrapping," a commonly accepted computer simulation technique. Because the results of any regression analysis are, by definition, estimates, I generate 500 expected default rates that account for the uncertainty in the estimates in my regression model and test whether, at the 95 percent confidence level, the expected default rate is statistically significantly higher than the actual default rate for the HSSL loans. Specifically, in each of the 500 simulation runs, I generate a random set of coefficients based on the estimated covariance matrix from my regression model. I also generate a random sample of HSSL loans by sampling, with replacement, from the population of HSSL loans. I apply the simulated coefficients to this randomly selected sample to estimate an expected default rate for the HSSL loans.[2] I calculate the difference between expected and actual default rates for each trial. I then construct a 95 percent confidence interval for this difference where the lower and upper bounds are equal to the 2.5 and the 97.5 percentiles, respectively, of the distribution of the differences. HSSL loans' outperformance or underperformance is statistically significant if the constructed confidence interval does not include zero.

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[1] I also include time indicator variables that control for the month relative to origination.

[2] *See* Amemiya, Takeshi, *Advanced Econometrics*, Cambridge: Harvard University Press, 1985, p. 286.

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II)   Identification of Comparable Loans

I selected the comparable loans from the Full Spectrum Lending data[3] using the following criteria:

1. Exclude all loans missing information for any of the variables included in my regression model.

2. Exclude all loans that do not have an application date, mortgage date, FICO score or cumulative loan-to-value (CLTV) ratio within the ranges covered by either the PHSSL loans or DHSSL loans, depending on the analysis.

3. Exclude all loans where loan status as of December 2012 is not available in the loan performance data provided by the Entity Defendants.[4]

I selected the comparable loans purchased by the GSE's using CoreLogic's Loan Level Market Analytics database using the following criteria:

1. Include all loans where Initial Investor Code = 253 (GSE).

2. Include only first lien loans.

3. Exclude all loans that do not have a FICO score or cumulative loan-to-value (CLTV) ratio within the same ranges covered by the PHSSL and DHSSL loans jointly.

4. Include all loans where the Origination Date is between August 1, 2007 and December 31, 2009.

5. Exclude all loans missing information for any of the variables included in my regression model.

6. Exclude all loans where loan status as of December 2012 is not available.

III)   Data Sources and Calculation of Variables

Entity Defendants provided loan characteristics and loan performance data for loans originated by the Full Spectrum Lending division between January 1, 2006 and December 31, 2009.   CoreLogic's Loan Level Market Analytics database provided loan characteristics and loan performance data on loans purchased by the GSEs.[5]

I define the variables used in my loan-level model as follows:

*   Loan Status

    Loan Status is a categorical variable that, in a specific month, takes a value of 1 if a loan has entered default/serious delinquency in that month, a value of 2 if a loan has prepaid in that month, or a value of 0 if the loan has done neither. For a given loan, all months preceding the month of default/serious delinquency or prepayment have a *Loan Status* value of 0. Loans that do not enter default/serious delinquency or prepay as of December 2012 have a *Loan Status* value of 0 for all months of the loan history.

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[3] "FSLDataForGovt_UWandLP_20130308 - Priv.xlsx", from Counsel.

[4] "FSL_RequestedPerformanceData_20130304.xlsx" and "WC_Final (service released loans).xlsx", from Counsel.

[5] According to CoreLogic, the database contains records from most of the top 20 servicers, includes approximately 65 percent of active Fannie Mae/Freddie Mac loans, and covers approximately 85 percent of the prime loan market. *See* "Loan Level Market Analytics Product Overview 1_2013.pptx", provided by CoreLogic.

Exhibit 12   2

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A loan is considered Defaulted or Seriously Delinquent if it is delinquent for 90 or more days, or is charged-off in the last month of loan tracking. As such, if a loan is current in the last month of loan tracking and is not prepaid, it is considered current for the entire loan history, even if it was delinquent 90 days or more at some point in its loan history. The date of default/serious delinquency is the first month a loan becomes Defaulted or Seriously Delinquent directly preceding the end of loan tracking. For example, if a loan entered default or serious delinquency in March 2008, returned to current in June 2009, and then re-entered Default or Serious Delinquency from February 2012 through December 2012 (the final month of this analysis), the default/serious delinquency date would be February 2012. Loans with a prepaid status on the last month of loan tracking are classified as prepaid.

- Equity

  Equity equals one minus the CLTV at origination adjusted for changes in house prices. CLTV is adjusted for the change in house prices in each month of the loan history by dividing the CLTV by one plus the percentage change in home prices from the Case-Shiller index, where available, and the Federal Housing Finance Agency otherwise, from the month that the loan was originated to the month of observation.[6] When available, the house price index is applied to loans at the Metropolitan Statistical Area (MSA)-level. When a loan is located outside of a MSA or is missing a property ZIP code, I use the average state-level house price index.

- Unemployment Rate Change

  The Unemployment Rate Change equals the unemployment rate in the observed month minus the unemployment rate in the month the loan was originated. I match a loan to its corresponding monthly unemployment rate at the MSA-level when such data are available and to the average state-level unemployment rate when MSA data are not available. Monthly unemployment data at both the MSA and state level are from the Bureau of Labor Statistics.[7]

- Treatment of Home Price Adjusted Equity and Unemployment Rate Change

  The model simultaneously controls for Equity and Unemployment Rate Change. I calculate quartiles (25 percent, 50 percent, 75 percent, and 100 percent) for the Equity and the Unemployment Rate Change variables and define sixteen indicator variables based on which quartile a given loan-month observation falls into with respect to the two variables. These variables capture the simultaneous impact of increases in unemployment and house price declines.

The other independent variables used in my loan-level model are described in the table accompanying this exhibit.

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[6] I use house price data from Fiserv. According to the Fiserv website, "Fiserv, Inc. (NASDAQ: FISV) is a leading global provider of information management and electronic commerce systems for the financial services industry, providing integrated technology and services that create value and results for our clients. Fiserv drives innovations that transform experiences for more than 16,000 clients worldwide, including banks, credit unions and thrifts, billers, mortgage lenders and leasing companies, brokerage and investment firms and other business clients."

[7] Bureau of Labor Statistics, "Databases, Table & Calculators by Subject: Unemployment," available at <http://data.bls.gov/cgi-bin/dsrv?la>.

Exhibit 12   3

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Exhibit 12 (Continued)

	Full Spectrum Lending Data	CoreLogic's Loan-Level Market Analytics Data
FICO Score*	*LoanFICOScore*; missing if *LoanFICOScore* < 300 or *LoanFICOScore* > 850	*FICO Score at Origination*; missing if *FICO Score at Origination* = 0
CLTV	*CLTV*; missing if C*LTV* < 1 or C*LTV* > 200	*Combined LTV at Origination*; missing if *Combined LTV at Origination* = 0
DTI*	*DTI*; 50 if *DTI* > 50; original value otherwise	*Back-End Ratio*; 50 if *Back-End Ratio* >50; missing if *Back-End Ratio* = 0; original value otherwise
DTI > 50*	1 if *DTI* > 50; 0 otherwise	1 if *Back-End Ratio*>50; 0 if 0<*Back-End Ratio* ≤ 50; missing otherwise
Primary Residence	1 if *OccType* = "PRIMARY-RESIDENCE"; missing if *OccType* = "Unknown"; 0 otherwise	1 if *Occupancy Type* = 1; 0 if *Occupancy Type* = 2 or 3; missing otherwise
Full Documentation	1 if *TradingDocType_Lynx* = "Full"; 0 otherwise	1 if *Documentation Type* = 1; 0 if *Documentation Type* = 2 or 3; missing otherwise
Interest-Only	1 if *IntOnlyFlagBit* = 1; 0 otherwise	*IO Flag*
Original Loan Balance	*LoanAmt* divided by 1,000	*Original Balance* divided by 1,000; missing if *Original Balance* = 0
2008-2009 Origination	1 if *FundDtTm* is in the corresponding year; 0 otherwise	1 if *Origination Date* is in the corresponding year; 0 otherwise
Single Family*	1 if *PropType* = "SFR", "Single Family Residence", or "PUD"; missing if *PropType* = "Unk"; 0 otherwise	1 if *Property Type* = 1 or 6; missing if *Property Type* = "Z", "X", or is missing; 0 otherwise
Loan Purpose	1 if *FinType* = "PURCHASE" or "Purchase"; 0 otherwise	1 if *Loan Purpose* =1; missing if *Loan Purpose* = "Z", "X", or is missing; 0 otherwise

Notes:
1. In the Full Spectrum Lending data provided by the Entity Defendants, *LoanFICOScore*, *DTI*, and *PropType* are obtained from *CMD_LoanFICO_Score*, *CMD_DTI* and *CMD_PropType,* respectively, if the corresponding *LoanFICO_ScoreChangeFlag*, *DTIChangeFlag*, and *PropTypeChangeFlag* flags are "Y".
2. The two DTI variables are defined in the same manner as in the Corrected McFadden Report.

Exhibit 12   4

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Exhibit 13-A1
Estimated Using Sample of Non-PHSSL Loans
Defaults and Serious Delinquencies as of December 2012

Control Variables	Estimated Parameter		Std. Error	*p*-value
FICO Score	-0.016	***	0.001	0.000
Original Loan Balance (in thousands)	0.001	***	0.000	0.000
CLTV	-0.068	***	0.005	0.000
DTI	0.006	***	0.001	0.000
DTI > 50	0.093	***	0.021	0.000
Full Documentation	1.605	***	0.177	0.000
Primary Residence	-1.270	***	0.337	0.000
Interest-Only	0.682	***	0.019	0.000
Single Family	-0.137	***	0.025	0.000
Purchase	-0.014		0.032	0.660
FICO CLTV Interaction	0.000	***	0.000	0.000
FICO Primary Residence Interaction	0.001	**	0.000	0.013
FICO Full Documentation Interaction	-0.003	***	0.000	0.000
FICO CLTV Full Documentation Interaction	0.000	*	0.000	0.085
2008 Origination	-0.105	***	0.020	0.000
2009 Origination	-0.826	***	0.064	0.000
Constant	2.767	***	0.527	0.000
Number of Loans:	117,210			

Note:

*** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

Sources:

[1] The PHSSL definition is from Appendix C of the Expert Report of Dr. Joseph R. Mason, May 7, 2013 and related back-up materials.

[2] FSL_RequestedPerformanceData_20130304.xlsx.

[3] FSLDataForGovt_UWandLP_20130308 - Priv.xlsx.

[4] WC_Final (service released loans).xlsx.

[5] Fiserv REdex Library Square Index Set, U.S. Census Division, State and MSA level indexes through December 2012.

[6] Bureau of Labor Statistics, National Unemployment Rate and Local Area Unemployment Statistics, available at <http://www.bls.gov/data/#unemployment>.

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Exhibit 13-A2
Estimated Using Sample of Non-PHSSL Loans
Defaults and Serious Delinquencies as of December 2012

	Increase in Equity											
	1st Quartile			2nd Quartile			3rd Quartile			4th Quartile		
	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value
1st Quartile	-0.419 ***	0.062	0.000	-0.999 ***	0.059	0.000	-1.438 ***	0.073	0.000	-1.797 ***	0.107	0.000
2nd Quartile	-0.368 ***	0.032	0.000	-0.801 ***	0.034	0.000	-1.035 ***	0.040	0.000	-1.366 ***	0.063	0.000
3rd Quartile	-0.281 ***	0.023	0.000	-0.648 ***	0.028	0.000	-0.928 ***	0.036	0.000	-1.131 ***	0.057	0.000
4th Quartile				-0.595 ***	0.030	0.000	-0.879 ***	0.046	0.000	-1.141 ***	0.065	0.000

Increase in Unemployment Change

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] Equity is defined as: Equity = 100% - [CLTV /(1 + Fiserv Change)] where the Fiserv Change is equal to the percentage change in the FISERV Housing Index between the period date and the origination date.

[3] The Unemployment Change is equal to the change in unemployment rate between the period date and the origination date.

Exhibit 13-B1
Estimated Using Sample of Non-DHSSL Loans
Defaults and Serious Delinquencies as of December 2012

Control Variables	Estimated Parameter		Std. Error	*p* -value
FICO Score	-0.018	***	0.001	0.000
Original Loan Balance (in thousands)	0.001	***	0.000	0.000
CLTV	-0.099	***	0.008	0.000
DTI	0.006	***	0.001	0.000
DTI > 50	0.024		0.031	0.436
Full Documentation	1.065	***	0.278	0.000
Primary Residence	-0.657		0.475	0.167
Interest-Only	0.675	***	0.034	0.000
Single Family	-0.184	***	0.036	0.000
Purchase	-0.076		0.055	0.165
FICO CLTV Interaction	0.000	***	0.000	0.000
FICO Primary Residence Interaction	0.000		0.001	0.546
FICO Full Documentation Interaction	-0.002	***	0.001	0.002
FICO CLTV Full Documentation Interaction	0.000		0.000	0.917
2008 Origination	-0.153	***	0.022	0.000
Constant	5.056	***	0.735	0.000
Number of Loans:	61,247			

Note:

*** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

Sources:

[1] FSL_RequestedPerformanceData_20130304.xlsx.

[2] FSLDataForGovt_UWandLP_20130308 - Priv.xlsx.

[3] WC_Final (service released loans).xlsx.

[4] Fiserv REdex Library Square Index Set, U.S. Census Division, State and MSA level indexes through December 2012.

[5] Bureau of Labor Statistics, National Unemployment Rate and Local Area Unemployment Statistics, available at <http://www.bls.gov/data/#unemployment>.

Exhibit 13-B2
Estimated Using Sample of Non-DHSSL Loans
Defaults and Serious Delinquencies as of December 2012

	Increase in Equity											
	1st Quartile			2nd Quartile			3rd Quartile			4th Quartile		
	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value
Increase in Unemployment Change — 1st Quartile	-0.408 ***	0.080	0.000	-0.939 ***	0.071	0.000	-1.204 ***	0.078	0.000	-1.719 ***	0.111	0.000
2nd Quartile	-0.352 ***	0.042	0.000	-0.681 ***	0.042	0.000	-0.955 ***	0.049	0.000	-1.285 ***	0.072	0.000
3rd Quartile	-0.272 ***	0.034	0.000	-0.640 ***	0.041	0.000	-0.948 ***	0.052	0.000	-1.261 ***	0.077	0.000
4th Quartile				-0.643 ***	0.046	0.000	-0.896 ***	0.064	0.000	-1.457 ***	0.094	0.000

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] Equity is defined as: Equity = 100% - [CLTV /(1 + Fiserv Change)] where the Fiserv Change is equal to the percentage change in the FISERV Housing Index between the period date and the origination date.

[3] The Unemployment Change is equal to the change in unemployment rate between the period date and the origination date.

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Exhibit 14A
Estimated Using Comparable Loans Purchased by GSEs
Defaults and Serious Delinquencies as of December 2012

Control Variables	Estimated Parameter		Std. Error	p-value
FICO Score	-0.013	***	0.001	0.000
CLTV	-0.018	***	0.004	0.000
FICO CLTV Interaction	0.000	***	0.000	0.000
Full Documentation	1.948	***	0.169	0.000
FICO Full Documentation Interaction	-0.002	***	0.000	0.000
FICO CLTV Full Documentation Interaction	0.000	***	0.000	0.000
Primary Residence	-1.169	***	0.185	0.000
FICO Primary Residence Interaction	0.001	***	0.000	0.000
Original Loan Balance	0.001	***	0.000	0.000
DTI (Censored)	0.016	***	0.001	0.000
DTI Greater than 50	0.030	**	0.014	0.035
Single Family	-0.254	***	0.013	0.000
2007 Origination	1.106	***	0.039	0.000
2008 Origination	0.828	***	0.039	0.000
Interest-Only	0.951	***	0.016	0.000
Purchase	-0.638	***	0.012	0.000
Constant	-0.565		0.407	0.165

Number of Loans:	682,217
Number of Loan Observations:	28,365,757

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] The samples used to estimate the models are composed of comparable loans purchased by the GSEs using data from CoreLogic's Loan Level Market Analytics database.

[3] The number of loan observations is the total number of monthly observations for all loans used to estimate the model.

Sources:

[1] CoreLogic Loan Level Market Analytics.

[2] The PHSSL definition is from Appendix C of the Expert Report of Dr. Joseph R. Mason, May 7, 2013 and related back-up materials.

[3] FSL_RequestedPerformanceData_20130304.xlsx.

[4] FSLDataForGovt_UWandLP_20130308 - Priv.xlsx.

[5] WC_Final (service released loans).xlsx.

[6] Fiserv REdex Library Square Index Set, U.S. Census Division, State and MSA level indexes through December 2010.

[7] Bureau of Labor Statistics, National Unemployment Rate and Local Area Unemployment Statistics, available at <http://www.bls.gov/data/#unemployment>.

Exhibit 14B
Estimated Using Comparable Loans Purchased by GSEs
Defaults and Serious Delinquencies as of December 2012

		Increase in Equity												
		1st Quartile			**2nd Quartile**			**3rd Quartile**			**4th Quartile**			
		Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	Estimated Parameter	Std. Error	*p*-value	
Increase in Unemployment Change	**1st Quartile**	-0.940 ***	0.056	0.000	-1.635 ***	0.057	0.000	-2.142 ***	0.067	0.000	-2.660 ***	0.105	0.000	
	2nd Quartile	-0.643 ***	0.034	0.000	-1.465 ***	0.043	0.000	-2.024 ***	0.059	0.000	-2.446 ***	0.098	0.000	
	3rd Quartile	-0.471 ***	0.014	0.000	-1.148 ***	0.021	0.000	-1.489 ***	0.032	0.000	-1.724 ***	0.054	0.000	
	4th Quartile				-0.896 ***	0.020	0.000	-1.230 ***	0.031	0.000	-1.579 ***	0.052	0.000	

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] Equity is defined as: Equity = 100% - [CLTV /(1 + Fiserv Change)] where the Fiserv Change is equal to the percentage change in the FISERV Housing Index between the period date and the origination date.

[3] The Unemployment Change is equal to the change in unemployment rate between the period date and the origination date.

Exhibit 15
Comparison of Defect Rates of PHSSL and Non-PHSSL Loans

Cowan Strata	Stratification Variable 1	Stratification Variable 2	Stratification Variable 3	Holt Not Materially Defective	Holt Materially Defective	Holt Material Defect Rate	Z- Test of Equality of Defect Rates [2]	
1	PHSSL	Default	LTV < 80%	82	58	41.1%	0.529	
2	Non-PHSSL	Default	LTV < 80%	36	31	45.8%		
3	PHSSL	Not-Default	LTV < 80%	94	25	21.2%	0.146	
4	Non-PHSSL	Not-Default	LTV < 80%	63	27	30.3%		
5	PHSSL	Default	LTV = 80%	19	8	28.7%	0.919	
6	Non-PHSSL	Default	LTV = 80%	21	9	29.9%		
7	PHSSL	Not-Default	LTV = 80%	21	6	23.0%	0.207	
8	Non-PHSSL	Not-Default	LTV = 80%	15	10	40.5%		
9	PHSSL	Default	LTV > 80%	40	92	70.0%	0.843	
10	Non-PHSSL	Default	LTV > 80%	23	50	68.6%		
11	PHSSL	Not-Default	LTV > 80%	31	50	61.6%	0.496	
12	Non-PHSSL	Not-Default	LTV > 80%	24	30	55.5%		
	All PHSSL Loans Reviewed by Mr. Holt			287	239	30.8%	0.022	**
	All Non-PHSSL Loans Reviewed by Mr. Holt			182	157	40.0%		

Notes:

[1] The defect rate for each of the PHSSL-Default-LTV stratum (that is, Cowan Strata 1, Cowan Strata 2, and so on) is calculated as the weighted average of the defect rates for each PHSSL-Default-LTV-FICO stratum, where the weights are the percentage of the population loans within the given PHSSL-Default-LTV bucket that have a FICO score within the range associated with that particular FICO stratum. The overall defect rate for PHSSL (or non-PHSSL) loans is then calculated as the weighted average of the defect rates for each PHSSL-Default-LTV stratum, where the weights are the percentage of the PHSSL (or non-PHSSL) population loans that have the given default and LTV characteristics.

[2] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

Sources:

[1] 2013.05.02 Final Data File.csv, file produced by Plaintiff.

[2] 2012-12-27 – Data to SDNY – US v Bank of America – Confidential.xlsx, file produced by Plaintiff.

[3] Sample.r, file produced by Plaintiff.

[4] John A. Rice, *Mathematical Statistics and Data Analysis* , Second Edition, Duxbury Press, 1995.

Exhibit 16

Comparison of Holt Materially Defective and Holt Non-Materially Defective Loans[1]

	Variable	Category	Holt Materially Defective Loans		Holt Non-Materially Defective Loans		*P*-value of the Test of Equality	
			Loan Count	Percent	Loan Count	Percent		
Categorical Variables	Performance as of December 2012	Current	180	45.5%	217	46.3%		
		Defaulted	145	36.6%	123	26.2%	0.001	***
		Paid-off	69	17.4%	127	27.1%		
		N/A	2	0.5%	2	0.4%		
	Occupancy Type	Investment	25	6.3%	13	2.8%	0.011	**
		Owner Occupied	371	93.7%	456	97.2%		
	Trading Doc Type	Full	126	31.8%	147	31.3%		
		Alt	131	33.1%	193	41.2%		
		Reduced	27	6.8%	10	2.1%	0.006	***
		Fast and Easy	79	19.9%	81	17.3%		
		Fast Track	29	7.3%	31	6.6%		
		Other	4	1.0%	7	1.5%		
	Property Type	SFR	365	92.2%	428	91.3%	0.628	
		Other/Unknown	31	7.8%	41	8.7%		
	Loan Purpose	Refinance	376	94.9%	455	97.0%	0.119	
		Other	20	5.1%	14	3.0%		
	Property State	FL	50	12.6%	42	9.0%		
		CA	34	8.6%	44	9.4%	0.357	
		PA	19	4.8%	26	5.5%		
		Other	293	74.0%	357	76.1%		

	Variable	Holt Materially Defective Loans		Holt Non-Materially Defective Loans		*P*-value of the Test of Equality	
		Loan Count	Mean	Loan Count	Mean		
Continuous Variables	Original Loan Balance	396	189,366	469	172,428	0.007	***
	CLTV	396	81	469	74	0.000	***
	DTI[2]	396	39	469	36	0.001	***
	FICO Score[3]	396	679	469	691	0.008	***

Notes:

[1] DTI values greater than 50 were set to be 50.

[2] FICO Scores of less than 300 and greater than 850 were set to missing.

[3] *** Statistically significant at the 99 percent level, ** statistically significant at the 95 percent level, * statistically significant at the 90 percent level.

Sources:

[1] Expert Report of Ira H. Holt, Jr., May 7 2013 and related back-up materials.

[2] FSL_RequestedPerformanceData_20130304.xlsx.

[3] FSLDataForGovt_UWandLP_20130308 - Priv.xlsx.

[4] WC_Final (service released loans).xlsx.

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Exhibit 17A

**Modification of McFadden Table 7 Logit Model (1) to Include Material Defect
Plaintiff's Definition of HSSL**

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	5.206	***	1.902	0.006
PHSSL	-0.4628		0.3623	0.202
Material Defect	0.347	*	0.191	0.069
LoanFICOScore	-0.015	***	0.002	0.000
DTI	0.008		0.010	0.420
DTI > 50	0.603	**	0.293	0.040
CLTV	0.036	***	0.007	0.000
Loan Amount	0.002	*	0.001	0.055
HPI Growth	-4.154	**	1.636	0.011
Refinance	0.155		0.497	0.756
2-4 Units	2.437	**	1.199	0.042
Condominium	0.953	**	0.419	0.023
Planned Unit Development	0.089		0.312	0.775
Unknown	0.336		0.688	0.625
Alt	0.297		0.242	0.219
Fast And Easy	0.733	**	0.317	0.021
Fastrack	0.862	*	0.463	0.063
Other	0.308		0.795	0.699
Reduced	1.554	***	0.507	0.002
Investment	-0.302		0.453	0.505
Secondary Residence	-0.021		0.533	0.968
Number of Loans	857			

Notes:

[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.

[2] Similar to Table 7 in the Corrected Expert Report of Daniel L. McFadden, June 6, 2013, this regression includes controls for fixed effects by State and by Origination Month.

Source:

Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

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Exhibit 17B

Modification of McFadden Table E2 Duration Model (1) to Include Material Defect
Plaintiff's Definition of HSSL

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	-2.684	**	1.353	0.047
PHSSL	0.073		0.16	0.649
Material Defect	0.219		0.137	0.110
LoanFICOScore	-0.014	***	0.002	0.000
DTI	0.008		0.008	0.322
DTI > 50	0.366	*	0.207	0.076
CLTV	0.033	***	0.006	0.000
Loan Amount	0.002	*	0.001	0.059
HPI Growth	-1.160	***	0.289	0.000
Refinance	0.200		0.31	0.520
2-4 Units	0.514		0.727	0.479
Condominium	0.891	***	0.287	0.002
Planned Unit Development	0.214		0.229	0.350
Unknown	-0.100		0.482	0.836
Alt	0.244		0.171	0.154
Fast And Easy	0.882	***	0.247	0.000
Fastrack	0.664	*	0.357	0.063
Other	0.095		0.551	0.864
Reduced	0.953	***	0.311	0.002
Investment	0.158		0.376	0.675
Secondary Residence	0.187		0.455	0.681
Number of Loans	857			

Notes:

[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.

[2] Similar to Table E2 in the Corrected Expert Report of Daniel L. McFadden, June 6, 2013, this model includes controls for number of quarters elapsed and fixed effects by State.

Source:

Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

Exhibit 17C
Modification of McFadden Table 7 Logit Model (1) to
Include HSSL-Material Defect and Non-HSSL-Material Defect Interactions
Plaintiff's Definition of HSSL

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	5.092	***	1.909	0.008
PHSSL	-0.318		0.407	0.435
PHSSL and Material Defect	0.224		0.246	0.363
Non-PHSSL and Material Defect	0.528	*	0.298	0.076
LoanFICOScore	-0.015	***	0.002	0.000
DTI	0.009		0.010	0.395
DTI > 50	0.603	**	0.294	0.040
CLTV	0.036	***	0.007	0.000
Loan Amount	0.002	*	0.001	0.055
HPI Growth	-4.282	***	1.645	0.009
Refinance	0.184		0.500	0.713
2-4 Units	2.466	**	1.202	0.040
Condominium	0.966	**	0.419	0.021
Planned Unit Development	0.086		0.312	0.784
Unknown	0.348		0.691	0.614
Alt	0.288		0.242	0.234
Fast And Easy	0.749	**	0.318	0.018
Fastrack	0.848	*	0.463	0.067
Other	0.322		0.797	0.687
Reduced	1.551	***	0.507	0.002
Investment	-0.290		0.453	0.522
Secondary Residence	-0.016		0.533	0.977
Number of Loans	857			

Notes:

[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.

[2] Similar to Table 7 in the Corrected Expert Report of Daniel L. McFadden, June 6, 2013, this regression includes controls for fixed effects by State and by Origination Month.

Source:

Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

Exhibit 17D
Modification of McFadden Table E2 Duration Model (1)
to Include HSSL Material Defect and Non-HSSL Material Defect Interactions
Plaintiff's Definition of HSSL

Control Variables	Estimated Parameter		Std. Error	*p*-value
(Intercept)	-2.676	**	1.353	0.048
PHSSL	0.054		0.217	0.803
PHSSL and Material Defect	0.235		0.186	0.207
Non-PHSSL and Material Defect	0.201		0.199	0.313
LoanFICOScore	-0.014	***	0.002	0.000
DTI	0.008		0.008	0.324
DTI > 50	0.365	*	0.207	0.077
CLTV	0.033	***	0.006	0.000
Loan Amount	0.002	*	0.001	0.059
HPI Growth	-1.160	***	0.289	0.000
Refinance	0.199		0.311	0.521
2-4 Units	0.505		0.730	0.489
Condominium	0.891	***	0.287	0.002
Planned Unit Development	0.214		0.229	0.350
Unknown	-0.099		0.482	0.837
Alt	0.247		0.172	0.151
Fast And Easy	0.882	***	0.247	0.000
Fastrack	0.666	*	0.357	0.062
Other	0.092		0.551	0.867
Reduced	0.956	***	0.312	0.002
Investment	0.155		0.377	0.681
Secondary Residence	0.188		0.455	0.680
Number of Loans	857			

Notes:

[1] *** Statistically significant at 99 percent confidence level, ** statistically significant at 95 percent confidence level, * statistically significant at 90 percent confidence level.

[2] Similar to Table E2 in the Corrected Expert Report of Daniel L. McFadden, June 6, 2013, this model includes controls for number of quarters elapsed and fixed effects by State.

Source:

Corrected Expert Report of Daniel L. McFadden, June 6, 2013 and related back-up materials.

Confidential

Exhibit 18
Number of Loans Reviewed and Defect Rate by Re-Underwriter

Re-Underwriter	# of Loans Reviewed	Share of Loans Reviewed	Number of Defective Loans	Defect Rate
Re-Underwriter 7	11	1.3%	6	54.5%
Re-Underwriter 107	5	0.6%	5	100.0%
Re-Underwriter 163	143	16.5%	34	23.8%
Re-Underwriter 272	15	1.7%	6	40.0%
Re-Underwriter 316	8	0.9%	8	100.0%
Re-Underwriter 375	127	14.7%	62	48.8%
Re-Underwriter 404	1	0.1%	0	0.0%
Re-Underwriter 555	43	5.0%	29	67.4%
Re-Underwriter 619	7	0.8%	3	42.9%
Re-Underwriter 682	138	16.0%	68	49.3%
Re-Underwriter 700	10	1.2%	3	30.0%
Re-Underwriter 701	1	0.1%	1	100.0%
Re-Underwriter 702	3	0.3%	1	33.3%
Re-Underwriter 729	14	1.6%	5	35.7%
Re-Underwriter 747	141	16.3%	70	49.6%
Re-Underwriter 898	4	0.5%	4	100.0%
Re-Underwriter 922	115	13.3%	49	42.6%
Re-Underwriter 969	78	9.0%	41	52.6%
Re-Underwriter 989	1	0.1%	1	100.0%
Total	**865**		**396**	**45.8%**
Prob>χ2 Statistic[1]			0.000	
Prob>χ2 Statistic[1] (>30 Loans Only)			0.000	
Min for >30 Loans Only				23.8%
Max for >30 Loans Only				67.4%

Notes:

[1] Prob>χ2 Statistic is the *p* -value for the Pearson's Chi Squared test of a difference in the defect rates across the re-underwriters.

[2] Defect rates are calculated as the percentage of loans with a Holt Material Defect flag (that is, any loan with "IQ"=3).

Sources:

[1] "2013.05.02 Final Data File.csv," received as part of the May 7, 2013 Plaintiff production.

[2] Expert Report of Ira H. Holt, Jr., May 7, 2013.

Exhibit 19
Defect Rate by Re-Underwriter, Controlling for Loan Characteristics

Dependent Variable is Holt Material Defect Flag
Results Reported as Odds Ratios and Corresponding *P*-Values
Odds Ratio Less than One Indicates Negative Marginal Effect

Control Variables	(A)	(B)
CLTV	1.039 ***	1.040 ***
	(0.000)	(0.000)
FICO Score	0.996 ***	0.996 ***
	(0.009)	(0.008)
Alternative Documentation	0.760	0.766
	(0.163)	(0.196)
Reduced Documentation	3.196 ***	2.999 **
	(0.007)	(0.011)
Other Documentation	1.424	1.487
	(0.133)	(0.108)
Purchase	1.070	0.961
	(0.869)	(0.925)
Original Loan Balance ($1000)	1.000	1.001
	(0.701)	(0.459)
Single Family	1.108	1.078
	(0.739)	(0.811)
Primary Residence	0.478 **	0.435 **
	(0.017)	(0.01)
2007 Origination	1.276	1.079
	(0.319)	(0.768)
2008 Origination	0.964	0.770
	(0.886)	(0.349)
2009 Origination	0.812	0.679
	(0.57)	(0.317)
CA, FL, NV or AZ	1.360 *	1.177
	(0.095)	(0.402)
DTI	1.020 ***	1.017 **
	(0.007)	(0.03)
Loan Specialist	0.831	0.876
	(0.256)	(0.441)
Re-Underwriter 163	0.258 ***	0.257 ***
	(0.000)	(0.000)
Re-Underwriter 555	2.550 **	2.607 **
	(0.019)	(0.017)
Re-Underwriter 682	1.062	1.055
	(0.822)	(0.843)
Re-Underwriter 747	0.930	0.931
	(0.784)	(0.786)
Re-Underwriter 922	0.774	0.765
	(0.363)	(0.34)
Re-Underwriter 969	1.229	1.226
	(0.508)	(0.516)
Group of Re-Underwriters with <=30 loans	1.583	
	(0.146)	
Constant	0.638	1.011
	(0.723)	(0.994)
Number of Observations	847	769
Probability that the odds ratios of the Re-Underwriters are equal	0.000	0.000

Notes:

[1] *** Statistically significant at the 99 percent confidence level, ** statistically significant at the 95 percent confidence level, * statistically significant at the 90 percent confidence level.

[2] *P*-values are reported in parentheses.

[3] Defect rates are calculated as the percentage of loans with a Holt Material Defect flag (that is, any loan with "IQ"=3).

[4] The reference categories are full documentation; not purchase; not a single family home; not a primary residence; origination date in 2006; not located in CA, FL, NV or AZ; not approved by a loan specialist; and re-underwriter 375.

[5] In Model B, loans reviewed by re-underwriters who reviewed 30 or fewer loans are excluded from the analysis.

[6] 17 observations are dropped due to missing property type data and one observation with DTI equal to zero is dropped.

[7] Following the same approach as that described in the McFadden Report, DTI is capped at 50.

[8] Following the same approach as that described in Appendix C of the McFadden Report, a loan is considered to have been reviewed by a loan specialist if the "SM_PC3_Title" variable in the loan database contains the phrase "Loan Specialist".

Sources:

[1] "2013.05.02 Final Data File.csv," received as part of the May 7, 2013 Plaintiff production.

[2] "2012-12-27 -- Data to SDNY -- US v Bank of America -- Confidential.csv," received as part of the May 7, 2013 Plaintiff production.

[3] "FSLDataForGovt_UWandLP_20130318 - Priv.xlsx," received from Counsel on March 22, 2013.

[4] Expert Report of Daniel L. McFadden, May 7, 2013.

[5] Expert Report of Ira H. Holt, Jr., May 7, 2013.